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CONTENTS

Editorial Notes	187
Bravo! Idaho Springs	188
The Workman Worthy of His Hire	188
Mine Valuation by Government	188
Copper in 1902	188
Market Conditions	189
Metallics	189
Mine Sampling.....*R. Gilman Brown*	190
Geology and Mining.....*P. Kirkegaard*	190
"Even Methuselah Died".....*Thomas Haight Leggett*	191
Estimates and Ore Reserve.....*Geo. E. Collins*	191
*Wilbur Clinton Knight	191
*Mining in South Africa. IV.....*J. H. Curle*	192
*Cross-Vein Ore-Shoots and Fractures....*W. H. Weed*	193
The Treatment of Broken Hill Sulphides..*A. A. Beadle*	194
*Water in the Mines of Cripple Creek..*Victor G. Hills*	195
Internally Fired Boilers	197
Platinum Production in 1902	197
*The Ore Deposits of Rossland, B. C. *Bernard McDonald*	198
Antidote for Cyanide Poisoning	200
Cornish Prospecting	201
Recent Work on the Mesabi Iron Range *Dwight E. Woodbridge*	201
Notes on the Sudbury District, Ontario	202
Iron and Steel Exports and Imports	202
Abstracts of Official Reports	203
Books Received	204
Books Reviewed	204
Recent Decisions	205
Correspondence	205
Questions and Answers	206
*United States Patents	206
British Patents	207

*Illustrated.

DEPARTMENTS

Assessments	221
Chemicals, New York and Foreign	219, 224
Coins, Foreign	220
Dividends	221
Financial Notes	220
Industrial Notes	209
Markets: Coal, United States and Foreign	216
Iron and Steel	217
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc	220, 221
Mining News: United States and Foreign	211
Mining Stocks	216
Mining Summaries	209
Obituaries	208
Personals	208
Schools, Technical	208
Societies	208
Stock Quotations	222, 223
Trade Catalogues	209

BY INADVERTENCE we omitted to state that the drawings illustrating Prof. Hofman's article, in our issue of July 25, were taken from the *Canadian Mining Review*, of April 30, 1903, where they accompanied a valuable article by Mr. S. S. Sorensen. We take pleasure in making this correction.

THE NEW PLACER discoveries of the Lake Arkell district in the Yukon region appear to be of importance. It is said that the ground yields as richly as the first finds on Bonanza and Eldorado creeks, near Dawson, which led to the Klondike rush. Other mineral discoveries are heralded from Alaska, and it is evident that there is much activity in the far North this summer.

MINING AFFAIRS along the Mother Lode in California are less active at this time than has been the case for a long period. Although the miners have gone back to work on a six months' agreement at some Tuolumne County mines, others are still idle. In Amador County there is doubt as to the future rate of miners' wages; and while the miners in Calaveras are still at work there are rumors of impending strikes. A number of mines in these counties remain closed for the present on account of labor troubles. The Miners' Union of Calaveras County has issued a statement to the effect that there is no trouble and that they are satisfied; nevertheless the spirit of unrest inaugurated in Amador, and followed later in Tuolumne, seems to prevail in this neighboring region also. Merchants are wary about ordering stocks of goods and mine-owners do not care to inaugurate any extensive operations just at present.

THE GOLD BRICK, which is supposed to be so popular in this country seems to have equally attractive qualities in Great Britain. As our correspondent says in another column, certain parties in that country have been doing quite a thriving business in selling gold which is supposed to have been secreted and in some unknown way forwarded by convict laborers in the Siberian mines. The story is rather a neat one, although it fails to explain just how the gold was conveyed from Russia to London. We should imagine that it would take a pretty heavy percentage of it to secure the connivance of Russian officials, but probably English buyers did not stop to think of that. As might have been expected, the Siberian gold turned out to be plain, ordinary brass filings, which have a value of their own, it is true, but considerably less than what the purchasers paid for them. We suppose, however, that the gold brick retains its vogue, because it represents the everlasting desire of human nature to get something for nothing.

THERE IS SOME TALK of dredging the site of the flourishing town of Oroville, Butte County, as it is estimated there are $15,000,000 in the gravel bed underneath the streets and houses. The buildings, lots, etc., could be purchased for a small sum as compared with that amount. Dredgers are now successfully working close to the edge of the town. Oroville lies on the bank of the Feather River, overlooked by hills upon which the town could be rebuilt, leaving the flat lands for dredging. In spite of this proposal, made more than once before, homes and business blocks continue to be built, most of them much costlier than those of previous years. But when town lots worth $1,000 are known to have, say, $10,000 in gold beneath them, there will be a general tendency to sell, unless there is a concerted effort to prevent dredging within the city limits. As the old river channel passes beneath the town, and there is much water, there was no thought of mining on the town site until the dredging process made such a thing possible.

THE DESCRIPTION of the distribution of water in the mines of Cripple Creek district which we publish in this issue, is a notable contribution to the data covering the occurrence of water in veins. In this case it would appear from the evidence that while the areas drained by mine workings do communicate by means of cross-fissures, nevertheless the character of that inter-communication differs widely, so as to be scarcely measurable in some instances and quite marked in others. Structural conditions present the determining factor. In some cases, described by Mr. Hills, it would appear that there exist isolated pockets of water along the line of the vein-fractures, and these, when tapped, have been shown to be too much for the capacity of pumps designed to meet an ordinary seepage. The decrease of water in depth is in accord with the experience of other districts, and in attributing it to the lessening of a fissured condition in the country rock, Mr. Hills is in harmony with other observers. The subject is one of great importance to the science of ore deposits, and we trust that other engineers in other regions will contribute their share of information on the matter.

BRAVO! IDAHO SPRINGS.

The little town of Idaho Springs, hitherto well known for its beneficent thermal waters, its beautiful mountains and its mines of gold and silver, has suddenly won fame by an act of outspoken manhood. Last week the people of this Colorado town were excited by the blowing up of the buildings at the Sun & Moon Mine, an act believed, on good evidence, to have been planned by the leaders of the local labor union who had vainly tried to break up the resistance to a strike. Without loss of time the citizens rounded up the fourteen men suspected of complicity in the act, and they were promptly marched out of town with a warning never to return.

To what extent it can be proved that the officers of the local miners' union were guilty of the explosion at the Sun & Moon Mine we do not know, and we expect that disavowals will be glibly made, as heretofore when worse outrages have been perpetrated after incendiary talk and persistent preaching of a thinly-veiled anarchy on the part of politician-laborers who neither toil nor spin—except when they spin falsehoods. To us the good feature of this picturesque incident is the evidence of an awakened public opinion, an outspoken message to the rest of Colorado that Idaho Springs is not going to be terrorized by the bestial outrages and cowardly murders which have disgraced other districts, as they have also injured the good name of Colorado as a State.

The creation of a healthy public opinion is the most effective antidote to the ignorant tyranny of labor-unions, just as it is also the only obstacle to the greed of the combinations formed by capitalists. An episode such as that at Idaho Springs indicates the existence of a lively civic spirit which is a very different thing from the mob rushes, which end in lynchings and are fully as bad as the deeds which they seek to redress. We hope, therefore, that the orderly, but decisive, action of the citizens of this mining town will inject a much needed vigor into the public opinion of the better element throughout our western mining regions.

THE WORKMAN WORTHY OF HIS HIRE.

On another page we publish a letter in which the work of the Canadian Geological Survey is warmly commended by a correspondent. It is a pleasure to see honor done where it is due. Mr. Kirkegaard knows whereof he speaks, and this will heighten the value of the compliment to the worthy geologists who have given such practical aid to the development of the mineral resources of the Dominion. We can only say to our Canadian friends that on this side of the international boundary the work of our own government geologists is held in equal esteem. And emphasis is given to this view when we have to confess that one aspect of the case which Mr. Kirkegaard regrets at Quebec is paralleled at Washington, namely, that the members of the national surveys and those who might desire to join them are frequently taken away from scientific pursuits by corporations, which offer much higher salaries. It is a thousand pities that governments cannot act after the manner of corporations, and exhibit an adequate recognition of the value of good service. We are aware, of course, that when a scientific or technical man has one eye on his duty and another on an increase of salary, he is scarcely the single-minded seeker after truth who is likely to do the best scientific work. Pot-hunting in sport and salary-chasing in technical science are equally subversive of character and, in the end, of results.

It is unfortunate that the dedication of a life to the disinterested scientific research which benefits a whole community should so often require a man to attain old age almost in poverty; it is equally regretful, on the other hand, that fine capacities should become debauched by huge salaries, stimulating the lust for that money which represents the brute power of the modern world. There should be a median line between these extremes—extremes which we see illustrated daily in the respective scientific and industrial departments of human activity. Civilization has progressed but blindly unless it appreciates the advisability of recognizing in a more practical way the services of the men to whom, after all, it owes the rise of its many storied structure from the swamp of savagery.

MINE VALUATION BY GOVERNMENT.

Among the various proposals for extending the duties of a paternal government, the most startling up to date is that which was seriously made in London by the President of the Council of West Australian Mine-owners, who suggested that a general inspector of mines be appointed by the State government with a view to periodical visits for the purpose of sampling and checking the ore reserves and estimating values in the producing mines. Furthermore, this inspector was to receive a salary which should "place him beyond the pale of temptation."

At the meeting Mr. H. C. Hoover pointed out the absurdity of the idea, but it seems to have been taken seriously by a number of those interested in West Australian mines.

The avowed purpose of this innovation, as stated by its proposer, was to do away with "the intrigue and manipulation of market operators who for their own base ends bribe the officers in charge of the mines to work the latter in the interests of the market," etc. It must be confessed that the wide divergence in the estimates of ore reserves by different engineers, which has characterized the sensational fluctuations in the share quotations for the Kalgoorlie mines, does justify criticism and warrants thoughtful consideration. On several occasions during the last ten years the share market has been rigged by concerted action between managers and operators, some of whom have been directors; in part this is explained by the fact that the mine-owners of the boom period have included a large proportion of accidentally rich men of low antecedents. Various coteries have striven in turn to oust each other in order to control the rate of production and sources of information at the mines. Several infamous episodes have disgraced the history of the Kalgoorlie companies, and it has required lots of good hard work to restore West Australian mines to the position of respectable investments which many of them now occupy.

Of course the idea of a government inspector, to value the mines as an independent appraiser, is wholly fanciful; the cost of sampling the large mines of one district alone, that is, Kalgoorlie, would run into half a million dollars, as Mr. Hoover said; nor must the element of time be forgotten; it would take a competent engineer at least three years to do the work thoroughly at Kalgoorlie alone, and it is safe to say that such a man would never be able to keep pace with the development taking place even in a few of the largest mines of Western Australia.

Moreover, such a man, unless appointed for life, would be the sport of political intrigue, and if his position were safe beyond dismissal his power would be such as it is inadvisable to delegate except under conditions for which there is no other remedy.

But there is another remedy. Let it be recognized that it is as unprofessional for engineers to traffic in mining shares, especially those of mines under their management, as it is for brokers to buy and sell securities for their own account. Give up the idea that a man is a better manager by becoming a stockholder, recognize that his judgment becomes vitiated by heavy financial participation, pay him handsomely not for putting up the price of shares, but for bringing the costs down; and when this has been done, turn round to headquarters and tell the directors that they are wrong when they gamble in the shares of the company whose trustees they are, let them publish all information from the mine promptly and before they use it for their own advantage, let it be beneath a director's dignity to sneak around the corner with a bit of official information before it is formally published; and then, as a final step calculated to lessen the vagaries of ore estimates, elect directors who have had sufficient experience in the business of mining to be capable of choosing capable managers and of supporting them loyally when once chosen. This will be much cheaper than the appointment of the impossible official suggested by the President of the Council of West Australian Mine-owners.

COPPER IN 1902.

In our issue of January 3 last, we gave an estimate of the statistics of copper for the year which had then just closed. We are now able to present a corrected, and more nearly complete statement. In this we give the figures which will appear in Volume XI. of "The Mineral Industry," comparing them with our figures for the previous year.

For reasons which will be appreciated by those familiar with the copper trade, the collection of statistics has been a much more difficult matter this year than ever before. We have, however, been able to secure figures from a large number of producers—to whom our thanks for the assistance rendered are due— and in nearly all the States the data for production are based on their returns. The exception is Montana, where the chief producer withheld all figures, refusing to make any statement whatever. In the absence of positive information, it has been necessary to make the closest estimate possible, basing it upon such figures as could be secured and upon knowledge of the condition of the mines and reduction works during the year. Our estimate of the production of the State is lower than that made for the United States Geological Survey; but collateral evidence has convinced us that it is much nearer the actual output.

With these explanations, we give the table below, in which the statistics for the year are presented; the figures being in long tons, of 2,240 lb., of fine copper:

	1901.	1902.	Changes.		Per Cent.
Arizona	56,332	53,501	D.	2,831	5.1
California	15,030	11,178	D.	3,852	25.7
Colorado	3,515	3,778	I.	263	7.5
Michigan	69,425	76,190	I.	6,765	9.7
Montana	102,621	107,165	I.	4,544	4.4
Utah	8,981	10,687	I.	1,706	18.9
Southern and Eastern States	3,063	6,071	I.	3,008	98.1
All others	7,750	4,115	D.	3,635	26.6
Copper in Sulphate	5,232	4,087	D.	1,145	22.0
Total Production.	271,949	276,772	I.	4,823	1.8
Stock Jan. 1	41,541	94,009	I.	52,468	...
Imports, Net	78,782	72,121	D.	6,661	8.5
Total Supply	392,272	442,902	I.	50,630	12.9
Exports	101,426	164,912	I.	63,486	62.8
Estimated Consumption	196,837	213,300	I.	16,463	8.3
Total	298,263	378,212	I.	79,949	26.8
Stocks, Dec. 31	94,009	64,690	D.	29,319	31.2

The imports of copper in 1902 were on a considerable scale. The statements given in the report of the Bureau of Statistics of the Treasury Department show the following totals, from which we deduct the re-exports of foreign material given by the same authority, as they represent chiefly material simply in transit through this country:

	Fine copper, lb.	Ores and matte, tons.
Imports	103,129,568	181,566
Re-exports	11,629,877	14,446
Net imports	91,449,691	167,120

The Treasury reports do not separate ores and matte, so that the returns from various countries show some singular contrasts on the face of the report. Thus there was received from Canada last year a total of 154,737 tons, and from Mexico 22,264 tons; yet the value of the imports from Canada was only $2,318,616, while the value of the Mexican material was $6,127,894. The explanation is simple; from Mexico we receive chiefly high-grade matte, while the imports from Canada are low-grade ores.

In order to arrive at an approximation to the quantity of metal contained in these imports, it is necessary to estimate closely, considering the values reported and the source of the imports. Working on these bases, we find that the copper contents of the foreign material imported last year were, approximately, 43,134 tons; the re-exports were equivalent to 11,861 tons, leaving 31,273 tons as the net imports in the forms of ore and matte. Adding to these the net imports of metallic copper—40,848 tons—we have total net imports equivalent to 72,121 tons, as given in the table.

The exports of copper in all forms during 1902 were reported by the Bureau of Statistics of the Treasury Department at 354,668,149 lb. metallic copper, and 18,035 tons ore and matte. Estimating the latter, as stated before, chiefly on the basis of values, we find that the total exports were equivalent to 164,912 long tons of copper, as stated in the table.

The consumption has been necessarily estimated, and we have placed it, after consultation with various authorities, at a figure which works out at about 40,000,000 lb. a month. This is a conservative figure, and some parties familiar with the trade are inclined to place consumption at a higher point.

The stocks at the close of the year represent what may be called the normal stock; that is, the quantity which must always be in process of treatment, in course of transportation, and otherwise in transition between the mines and the final forms in which the metal reaches the consumer. In other words, the excessive stocks which existed at the opening of 1902, wholly disappeared during that year. They were absorbed by the heavy consumption of the year; and 1903 opened with no surplus of copper in sight.

MARKET CONDITIONS.

August 5.

The metal markets are feeling the effects of conditions in Wall Street. While consumption continues good and manufacturers are generally busy, the heavy fall in industrial stocks and uncertainty as to the position have created a feeling of distrust and suspense which rather discourages new business.

The active buying of copper, which we noted last week, has fallen off very considerably, the immediate demand having been satisfied. Consumers who are now generally supplied for August are again holding back, and comparatively little business can be reported. Under these circumstances prices show no change. The general conditions continue favorable, and it is to be noted that such orders as are received, both from home and foreign buyers, are for immediate delivery. In London standard copper has recovered a little, but there is not much speculation.

Tin is rather strong for the present. Spot supplies are short, and there is comparatively little tin afloat for this port. Holders have taken advantage of this, and there is at the present time a premium of considerable amount for August deliveries. Futures show little change, however, and a few arrivals will do away with the existing advance.

Lead continues unchanged. Deliveries are somewhat better, as metal is coming forward more freely from the West. Sellers, however, still decline to guarantee any time for delivery on future orders.

Spelter continues strong and current demand from galvanizers and brass-makers is fully up to the production. It is to be noticed, however, that prices for September and October delivery are somewhat easier. The Joplin ore market continues unchanged, with all the ores offered taken up promptly at current prices.

Silver has been fairly steady, chiefly under the influence of a stronger demand from India and China. There has also been a considerable shipment to the Straits, and this may be expected to continue.

The iron trade continues in the main a waiting one, and large buyers are still practically out of the market so far as fourth quarter business is concerned. There has been some selling of pig iron in Pittsburg and in the East, but it has been mainly in moderate-sized lots for immediate delivery. The greatest demand has been for foundry iron, although the bar mills have taken some gray forge, particularly in the East. The reduction in prices made by the Alabama furnaces has had little effect in stimulating trade, and some of the outside makers have been selling pig even below the reduced prices of the association. As low as $12 for No. 2 foundry at Birmingham has been quoted. Naturally buyers are not doing much until matters are a little more settled.

In finished material conditions are very much the same. Buyers are holding off for reductions, and are not at all certain about future business. The trade has been largely of a retail character. The structural trade has been practically killed for the season by labor troubles, and any considerable recovery is doubtful.

Reference is made elsewhere to certain changes in the United States Steel Corporation. The resignation of Mr. Schwab has been recognized as inevitable for some time past, and no surprise can be expressed. The change was used in Wall Street as a lever to depressed prices, but without any apparent reason, since the retirement of Mr. Schwab was simply the recognition of a condition which already existed.

The Western coal trade, so far as local consumption is concerned, remains steady. Supplies are good and demand is somewhat less than it has been. Manufacturing consumption is fair, and domestic trade better than usual at this season. The lake trade is somewhat disturbed by irregularities in transportation. Deliveries are not as prompt as shippers desire. The railroads, however, claim that they are doing all that is possible to move coal promptly. Lake rates continue fairly steady. The anthracite shippers from Buffalo succeeded last week in securing a small reduction, but this has not affected shipments from Cleveland, Ashtabula or other Lake Erie ports. There has been some talk of increasing prices on lake coal, but nothing definite has been done.

Some complaint is heard about slow deliveries of coke in the Mahoning and Shenango valleys, and furnaces are not so well supplied as they have been. The same condition with regard to coke exist also in southern Ohio and along the lakes.

The seaboard bituminous trade continues quiet, and is controlled largely, so far as the better grades of coal are concerned, by car supply at the mines. The lower grades are in sufficient supply with prices weak.

The anthracite trade, though less active than it has been, continues to call for the total output of prepared sizes. The market for steam sizes is dull, and a considerable tonnage is going into storage. The general outlook for the trade is excellent.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

A pseudo-science does not necessarily consist wholly of lies. It may contain many truths, and even valuable ones. The practitioners of the pseudo-sciences know that common minds, after they have been baited with a real fact or two, will jump at the merest rag of a lie, or even at the bare hook. When we have one fact before us, we are very apt to supply the next out of our own imagination.

In science, read by preference the newest books; in literature, the oldest.

The relation of cause and effect is the fundamental law of nature. There is no recorded instance of an effect appearing without a previous cause, or of a cause acting without producing its full effect.

Inductive reasoning is the arduous process of finding the meaning of phenomena by collecting and classifying facts and thinking out their causes.

Deductive reasoning is the shorter operation of finding what effects must result from the operation of a known cause.

The scientific method of discovering the causes of phenomena involves the use of both inductive and deductive reasoning linked together by imagination, a mental power which is as essential to the scientific discoverer as it is to the fact.

Matter is that which occupies space, or that which can be perceived by the senses.

Energy is the power of doing work. Mass is the term used to denote quantity of matter. Volume is the amount of space occupied by a body, and if matter were of one kind and always in the same state, the same mass would always fill the same volume.

When the form or volume of a body is altered, the body is said to be *strained,* and the set of forces which produce strain is called a *stress.* Stresses act always in two opposite directions, either as a push or a pull.

Rigidity is the resistance that a solid body offers to shearing stress. The tendency of a body to recover from strain and return to its previous form and volume when the stress ceases to act is termed *elasticity.*

Surface tension is the tendency all liquid surfaces have to become as small as possible. A small portion of a liquid thrown off as a drop shrinks into a little sphere, because a sphere has the smallest surface possible containing a given volume.

Charcoal and diamonds are simply forms of pure carbon, and each has been changed into the other by the action of energy in certain ways.

To convert pounds troy into pounds avoirdupois, multiply by 0.82286. To convert pounds avoirdupois into pounds troy multiply by 1.2153.

A cubic foot of gold of specific gravity 19.361 would weigh 1208.5 lb.

Definiteness in thought and description does not require perfect accuracy in observation. We must always be definite in order to be clear. If he wishes to be definite in thought the student must never rest content with the dubious "I think" or the vague "about," but endeavor after the clear "I know" and the precise "with a probable error of."

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

MINE SAMPLING.

The Editor:

Sir.—In the penultimate paragraph of Mr. Walter Harvey Weed's letter of July 7 he has apparently committed himself to the astounding result of getting an average of $85 per ton, according to one method, or $67.25 according to another, from five samples the highest of which was $30; under the circumstances it is hard to see how the second method is much better than the first, as the actual average of the five samples turns out to be $16.31, as any one may find by multiplying each value by its width and dividing the sum of the results by the sum of the multipliers—in this case 424 ÷ 26.

I trust that Mr. Weed will excuse this quizzing, which is merely to call attention to his having omitted to divide the numerical average of the foot-dollars by the average feet of width.

What is more necessary to call to his attention is that his second method of obtaining averages is indefensible. Starting at the root of the matter, the true average of any set of samples is obtained by multiplying the value of each by the width of each and dividing the sum of the products by the sum of the widths. The average width of course in the case where samples are taken equidistant is the numerical average of the widths. This has been explained recently in the series of articles in the JOURNAL that prompted this discussion; a little earlier Mr. A. G. Charleton referred to the matter in Volume IX. of the *Transactions* of the Institution of Mining and Metallurgy, and once at least in an earlier volume of our own Institute the subject has been discussed. All of these papers have been of admirable clearness, and will certainly bear re-reading at intervals by every engineer. In passing on I would like to call attention to one detail: While the average value of the rock will truly be determined as above, the average stoping value of the rock in cases where the widths run down to a smaller space than a man can work in must for correctness be referred to least stoping width.

However, this is a matter aside. Returning to the question in hand, I append below a list showing the average values of the five samples according to Mr. Weed's two methods, substituting for his results those obtained by using the proper average width divisor, and the averages also worked out, rather as matter of curiosity, for the second method but using true averages for the sections between each pair of samples. As a further explanation of this last let it be noted that Mr. Weed's parenthetical values in no wise represent the true values for those sections, as they are bare numerical averages, giving the same weight to a two-foot sample and a ten-foot sample. Thus he gives the average for the width between the first two, samples as 6 ft, which is correct; he obtains his average value in the same way:

$\frac{20 + 2}{2}$ equals $11.00. The error is evident:

$20.00 × 2 ft. equals 40 foot-dollars.
$2.00 × 10 " " 20 " "

12 " " 60 " "

$\frac{60}{12}$ — equals $5.00, the true average for the first section.

But there is another error that crops up in this method of sections or panels; it is that the three middle samples are used twice, while the first and last but once, and as in this case the first and last samples are the highest, the resulting average is too low. Of course with a large suite of samples, such as would obtain in most practical work, this error would not be large, but it is hard to see any excuse for this method in mine valuation. The comparison is as follows:

True averages as given by Mr. Weed's first method	$16.31	5.2 ft.
Average by sections, Mr. Weed's second method	13.48	5.0 ft.
The same with true sectional averages	12.69	5.0 ft.

This comparison satisfactorily shows the extent of error easily obtainable by an incorrect system of averaging, which extends to width as well as value.

All of us, I fancy, have had experience of the matter mentioned in Mr. Weed's last paragraph, of a mine being "dressed for examination." It is the common dodge of the prospector, who runs well into a good bunch, and leaves it for the engineer to sample and goes to another part of the property to repeat the "dressing." But there is another point, which calls for the careful investigation of the engineer: It is a common claim among promoters that the actual results from mill-runs furnish a better indication of the value of the ore reserves in a property than any amount of sampling, and this claim can be so plausibly supported that, by the investor at least, it is frequently accepted as truth. As a matter of fact the owners are apt to be pressed for money, otherwise they might not have wished to sell the mine, and in that case they are sure to have handled the better grade of rock, so that the result of past operations would not in any way represent the value of the ore left. I have a case in mind where the drifts were at times run very high. The high spots turned out to be in particularly good ore; in this case but little stoping had been done and considerable development, and until one had seen the property the claim that the value of the ore extracted represented the value of the ore left seemed a most plausible one.

R. GILMAN BROWN.

San Francisco, July 25, 1903.

GEOLOGY AND MINING.

The Editor:

Sir.—The discussion in your columns during the past three or four months concerning the part that the geologist plays in actual mining has been followed with much interest by the writer. The arguments brought out in this discussion by many able contributors and well known authorities confirm the writer's own experience that the practical miner (if we take this term to mean the mining engineer who is trained for the exploiting and working of mines) is being greatly assisted in his work by the geologist. We must not lose sight of the fact that lode mining by modern methods belongs to the last fifty years or less (there are many men living who can remember the primitive methods in use when lode mining was begun in various parts of the United States), and the man who has followed mining for, say, only the past ten to fifteen years, must admit that the industry has received vast and valuable assistance from the professional geologist.

In Canada, which has not been represented in the discussion, the geological corps both of the provincial and federal governments have not only given much help in the working of known ore-bodies—the writer can testify to having received valuable assistance from the provincial geologist, in revealing the mysteries of the complicated vein-system existing here at Deloro mine—but they have brought to light not a few hitherto undiscovered mineral deposits.

A great deal of the mining now going on in this county is due entirely to the advance work of the geologist. In my own district—North Hastings—it was a geologist (Vennor) who first recognized the presence of gold in 1865. To attempt to refer to even a small part of the valuable economic work which has been done by geologists in this country would take up too much space; a few examples will suffice: The work of Sir William Logan, the first director of the Dominion Geological Survey, who began his explorations in Canada in the early 'forties, is well known. His reports on the coal fields of Nova Scotia and other more western areas have been of great value to the miner. Sir William Logan's work also shows the value of what may be called negative evidence; to this more attention should be given, in geological exploration. Soon after beginning his labors in Canada he showed that the two provinces, Ontario and Quebec could not possess coal deposits. The chief reason that induced the Government of the two provinces, which then composed Canada, to employ Logan, was to have him discover a supply of coal. If Logan's advice had been followed by the so-called practical miners, much capital and labor would have been saved during the last sixty years in the fruitless search for mineral fuel. Even at the present time a diamond drill is in operation in southeastern Ontario in the search for coal. Both of the two important gas-fields in Ontario were discovered by a trained geologist, Mr. Eugène Coste, at one time a member of the Dominion Survey, now the president of the Canadian Institute of Mining Engineers.

On the other hand, several areas have been exploited in this province by men who had much experience in successful drilling in Pennsylvania and elsewhere. Their geological training was, however, deficient, as the areas on which they worked would be condemned by any competent geologist. Any one who has read the remarkably accurate prophecy made by the late director of our geological survey, Dr. G. M. Dawson, on the Yukon Territory, now generally known as the Klondike, in his report for 1887, cannot but admit that his work has been of great economic value. Dr. Dawson's name is revered by prospectors and mining men generally in British Columbia, where he was a pioneer explorer.

Mention should also be made of the valuable discoveries of iron ore which Mr. A. P. Low made on the other side of the continent, in Labrador.

Then there is the work of Mr. Hugh Fletcher, another member of the Dominion Geological Survey, whose services are highly prized by the mining men in the great coal-fields of Nova Scotia and Cape Breton. In this section of country, North Hastings, there is the important work which has been done on the corundum deposits by Prof. W. G. Miller, formerly professor at Kingston School of Mining, now provincial geologist for Ontario. Much praise is due for this most thorough exploration; so carefully was this examination done and correctly mapped out in the beginning that very little of importance has since been found to add to it.

Not only has the geologist mapped out the area of the corundum-bearing rocks, but he is keeping in close touch with the development of the various deposits, which promise to become of importance as a staple industry. Then there are the important iron ranges in Northern Ontario which have lately been brought to light. These deposits were passed over by our prospectors and miners as being of no value, the outcroppings being low-grade; the trained geologist, however, recognized at once the resemblance between these ranges and those on the south shore of Lake Superior, and drew attention to them, and is now facilitating their development. Another fact which proves that the work of the geologist is valued for its economic character is that our most efficient government officials are constantly being enticed away by private companies, who offer much higher remuneration. One may well ask this question: Why is it that the government—considering it as a board of directors acting for and responsible to the people of the country, the owners of the assets and the stockholders directly interested—persistently refuse to recognize the value of highly skilled professional men's service, when private corporations only representing the interest of a comparative few find it true economy and to the best interests of their stockholders to pay these same men adequate salaries? Instances of this are seen in the case of Mr. J. B. Tyrell, now in the Klondike, and Mr. McEvoy with the Crow's Nest Coal Company. Reference is here made to the work done by the geologists in Canada, purposely leaving it open for some abler pen to call attention to the splendid work done by the geologists all over the United States, in the past and at the present time.

As seen by the writer—after seven years' residence in Canada, and during this time observing the progress made in mining over the widely separated districts—the Canadian geologists have done a vast amount of good work for the miner and the mining industry of the country. This is the more remarkable, considering the great scope of country to be covered and the very few men engaged in the work.

It is only during the last year that the Ontario government has awakened to the fact that the mineral resources of that province are one of its most valuable assets and through the intercession of men actively engaged in mining and with the able assistance and co-operation of the Director of the Bureau of Mines, Mr. Thos. W. Gibson, the Premier, the Hon. G. W. Ross and the Commissioner of Crown Lands, Hon. E. J. Davis, the government was prevailed upon to appoint Prof. W. G. Miller as provincial geologist. This appointment has proved to be eminently satisfactory to those directly interested in mining.

In conclusion, I would say that the field is large enough for both geologist and trained mining engineer. Both classes of men achieve results of the very highest economic importance each in his own chosen field—while one class is better suited than the other to do some kinds of work, yet the work of each is important and indispensable to the other. Geologists readily admit that they receive much valuable assistance from the mining engineers, from the men who are doing the actual mining, and we believe from our experience that the latter as a class are no less generous.

The mining engineer, while drawing on the help of the geologist, will, in the future, even more than in the past, be under great obligations to another of his fellow technical brothers, the mechanical engineer.

P. KIRKEGAARD.

Deloro, Ontario, Canada, July 27, 1903.

"EVEN METHUSELAH DIED."

To the Editor:

Sir.—In the article under this heading in your issue of May 2, 1903, you ask whether the professional men who are directing the work upon the Rand are not evading the probability of a decrease in richness of the Main Reef Series at the greatly increased depths, now so much talked about; and you remark: "However, to us there seems to be a much stronger reason for scepticism concerning the uninterrupted persistence of pay-ore, ore capable of yielding a good margin of profit, to such tremendous depths as those contemplated in the discussion on winding plants. A vertical depth of 8,000 ft. means a distance from the outcrop, as measured on the average dip (26°) of the reef, of over 18,000 ft."

In the writer's paper on Deep-Level Shafts on the Witwatersrand, etc., read at the Canadian meeting of the American Institute of Mining Engineers in August, 1900, the following remarks occur: "It is now pretty generally believed by engineers that the development of mechanical appliances for deep mining will keep pace with the requirements; hence the mechanical problems involved in mining at depths in excess of this figure may safely be left until mines working at 3,000 to 4,000 ft. in depth are paying dividends. Beyond this, it is certainly not necessary to go at present; for, although progress in the direction of deep mining upon the Rand has been startlingly rapid, it is still the logical result of underground development—of the yield of gold and the profits obtained from deep-level mines now in the producing stage.

"Public confidence in deep-level mining upon the Rand may be said to have been firmly established by the results obtained from the first and second row of deep-levels; and, if we now turn towards the 4,000 to 6,000 ft. deep-level areas in the confident hope of accomplishing similar results, certainly the development of still deeper areas is not likely to be undertaken for some years to come, or until the *crux* of the whole question, namely, the profitable character of the deposits, has been fairly well demonstrated at the depths first mentioned."

In a paper written by Dr. Frederick H. Hatch and myself, giving an estimate of the gold production and life of the Main Reef Series down to 6,000 ft., and read at the October, 1902, meeting of the Institution of Mining and Metallurgy in London, the writers stated: "In certain sections of the Rand, however, the nature of the reefs will probably prohibit their being worked to even 5,000 ft." In the Modderfontein-Geduld area they state, "a vertical depth of only 4,000 ft. has been taken," and they are particular to point out that "reef lying at a depth of 6,000 ft. can be worked out by means of inclines from vertical shafts of but 4,000 to 5,000 ft. in depth."

So far as the writer is aware there are to-day no vertical shafts to go 6,000 ft. projected upon the Rand, but there are a number already started and about to start that will have to go to depths of between 4,000 and 5,000 ft.

The recent discussion of the problem of very deep hoisting by the mechanical engineers must be considered as simply paving the way for that work when it becomes necessary to take it up. It does not at all follow that shafts of 6,000 ft. depth or over are soon to be started, especially in view of the fact, already pointed out, and which I feel cannot be too strongly emphasized, that reef lying at these greater depths can be extracted, if it be found profitable to do so, through the shafts already projected and which do not exceed the present known limits of practical mining.

Trusting the foregoing may serve to allay any anxiety existing on your side of the water as regards too precipitate a development of very deep-level ground on the Rand, believe me,

THOS. HAIGHT LEGGETT.

Johannesburg, S. A., July 1, 1903.

ESTIMATES AND ORE RESERVES.

The Editor:

Sir.—I am reluctant to trespass further on your space; but if your readers will take the trouble (which Mr. Argall apparently has not done) to look up the subject matter under discussion, they will find that his sketch showing outline of pay-ore estimated is identical with mine (March 14, 1903).

The "unusual phenomena" of comparatively regular impregnated beds, the existence of which Mr. Argall assumes for the sake of argument, already provide a considerable share of the world's mineral output; and are likely to increase in relative importance.

GEORGE E. COLLINS.

Denver, Colo., July 29, 1903.

ERRATUM.—The paragraph near the top of the third column of page 154 of our last issue, in which working costs are quoted, refers to the Smuggler-Union Mine.—EDITOR.

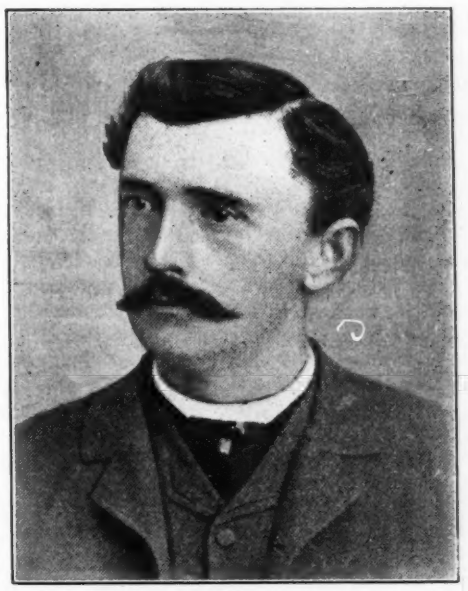
SAWING SLATE.—A writer in the Philadelphia *Ledger* says that probably the most expensive saws in use anywhere in the world are those in the factories of Pennsylvania, where various articles are manufactured of slate. In one of these factories there are 300 horizontal saws, 12 ft. in length, each of which is furnished with 75 cutting diamonds, each saw being worth $5,000. The slate used for roofing is split and turned by special machinery; but when slate is cut up for use in other ways the procedure differs. The huge horizontal saw, with its scores of diamonds in the factory, is called into play; it is lowered upon one of the blocks of slate by a ratchet at the rate of ¼ in. a minute. The saw would cut through iron or steel at the same rate. The workmen play a stream of water upon the slate to keep it cool, and wash the dust from the cut. After the sawing the block is planed by being moved back and forth by machinery under a firmly fixed chisel. It is afterwards polished, much as marble and granite are.

WILBUR CLINTON KNIGHT.

Dr. Wilbur Clinton Knight, Professor of Geology and Mining Engineering at the University of Wyoming and Curator of the State Museum, died on July 28, at Laramie, Wyoming, of peritonitis. He was born at Rochelle, Ill., December 13, 1858, and was educated in the common schools of that place. He graduated from the University of Nebraska in 1886. He was Assistant Territorial Geologist of Wyoming in 1886, and from 1888 to 1893 was in charge of mines in Colorado and Wyoming. In 1893 he was elected Professor of Mining Engineering, and since 1894 has been Professor of Mining and Geology in the University of Wyoming; since 1897 he has been State Geologist of Wyoming.

He was a fellow of the Geological Society of America, a member of the American Institute of Mining Engineers, a member of the Geographical Society of America, and has written many bulletins. He was a regular contributor to various technical papers, and his bulletins on "Oils of Wyoming" have been copied all over America and Europe.

The Smithsonian Institute, the Carnegie Museum and other institutions have many specimens discovered and forwarded by Professor Knight. It was mainly through his efforts that Harvard, Yale and other institutions of learning in the East sent expeditions to the Wyoming fossil fields, where valuable discoveries were made. He was also responsible for the unequalled collection of dinosaurs and other prehistoric animal specimens owned by the University of Wyoming.



WILBUR CLINTON KNIGHT.

For the past year he had been on leave of absence from the University of Wyoming, and was connected with the Belgo-American Drilling Trust as consulting chemist.

He was married October 16, 1889, to Miss I. Emma Howell, of Omaha, and leaves one daughter and three sons.

Prof. Knight had done much good work, and his early death is sincerely regretted. Our readers will doubtless recall his valuable papers on mineral resources of Wyoming, which have appeared from time to time in the ENGINEERING AND MINING JOURNAL and "The Mineral Industry." His years of earnest service in Wyoming especially identified him with that young State, where his loss will be severely felt.

COAL IN BORNEO.—Mr. Richard B. Martin, presiding this week at the half-yearly meeting of the British North Borneo Company in London, stated that there was every probability of a large company being formed to work the coal-fields originally discovered by Mr. A. Dunlop in the vicinity of Cowie Harbor.

MINING IN SOUTH AFRICA. IV.—RHODESIA, COAL, COPPER, DIAMONDS.

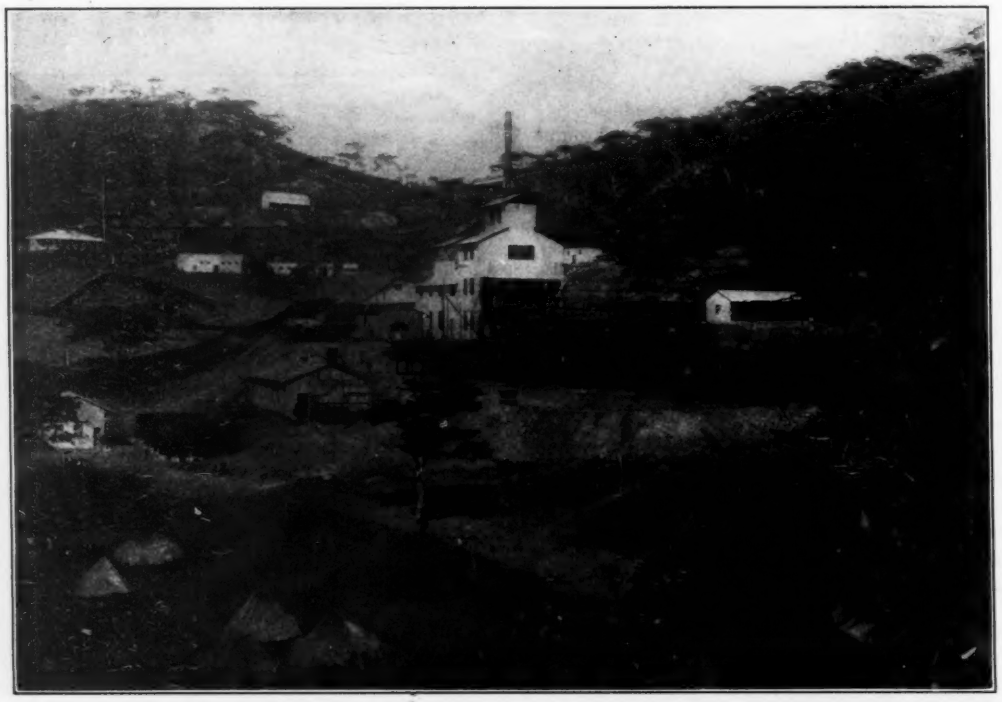
By J. H. Curle.

The quartz mines of Rhodesia lie 500 miles north of the conglomerate mines of the Transvaal. In another respect, too, these gold fields are wide apart, for the ore in the Transvaal is regular in value and proved for many years ahead, while in Rhodesia the ore is, as a rule, both irregular in yield and in occurrence.

It is thirteen years since the pioneers entered Rhodesia and fought the native tribes for its possession. Since that time the settlers have been through several native wars, have faced fever continuously, have suffered drought, and then famine, have lost their cattle by rinderpest and their crops by locusts and have been for years in the field against the Boers. In spite of these great troubles they have prospected a vast country from end to end, have discovered hundreds of mines, and have brought many to the producing stage. The Chartered Company has done a great work in civilizing and in building railways through what may be described as an immense desert, and English capital, raised by the mining and development companies, has literally been poured into the country. I consider the development of Rhodesia, all things considered, a wonderful achievement, the greatest of this sort the world can show; it was the masterwork of the biggest Englishman of his time.

That is one side of the question; it is a pleasing side. On the other, I have to record the facts shown by the gold mines as the result of all this energy and capital expended in their development; and these facts are disappointing. I do not say there is no gold in Rhodesia, for the country is full of it; there are hundreds—perhaps thousands—of quartz ledges, and ancient workings exist from one end to the other; but in nineteen cases out of twenty the gold is not found in quantities which will pay commercially, and as yet no mine of the first rank has been found.

The gold yield of Rhodesia is now about 20,000 ounces a month. It is a sign of the lax way mining is carried on out there that the mines are allowed to make their returns in bullion of no standard value, and the Rhodesian ounce may stand for anything between $15 and $20. The output will continue to increase, as new mines start to crush, and I expect within two or three years will have reached to fully 35,000 to 40,000 ounces per month.



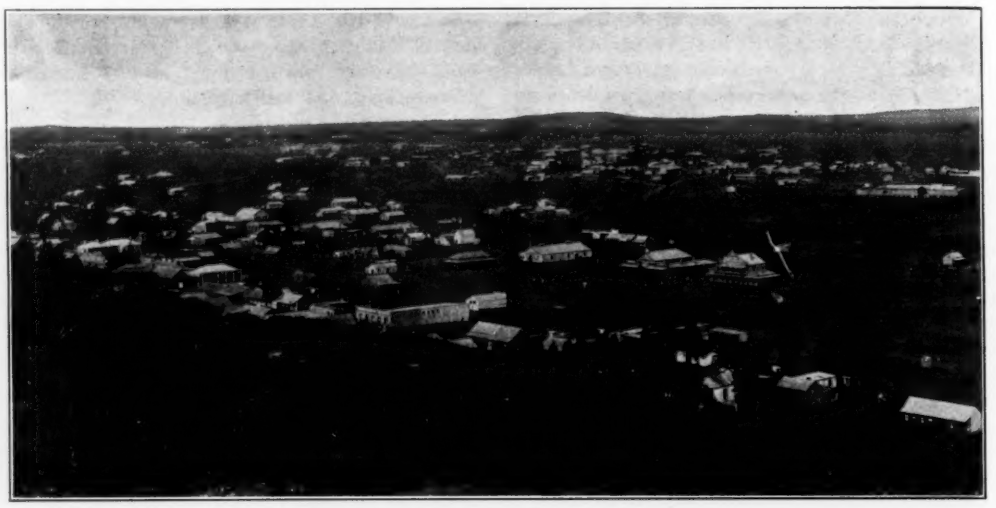
WANDERER MINE, SELUKWE DISTRICT, RHODESIA.

On this basis Rhodesia may support a few thousand whites; its railways may earn interest on their debentures by carrying coal and supplies to the mines; and the industry may indirectly benefit South Africa. But I feel sure that with rare exceptions its gold mines won't pay; the Chartered Company is not likely to recoup itself for the millions already sunk in the country, and the average speculator who has placed his money there will, in the long run, come out a loser.

All the mining done in Rhodesia has been on quartz ledges, the existence of which was indicated by ancient workings. These workings have, in places, been found to penetrate to a depth of several hundred feet, but the usual depth is about 60 ft. In many cases it has been found that pay ore does not extend below the old workings. This is interesting as showing the comparative thoroughness of the ancients in their mining, but it is disconcerting to realize that many of the ore-shoots cannot be relied on to carry payable values to even 100 or 150 feet.

Rhodesia is a country of narrow ledges and short ore-shoots. In a schistose formation, a narrow ledge may cut out at any time, and there have been plenty of such cases there. But even a well defined fissure in a strong formation, if it is narrow, and if the pay shoot is short, is not the sort of mine to expect much of.

Let us take for analysis a typical Rhodesian mine: The ledge is 3 ft. thick; the pay-shoot is 600 ft. long; and every level of 100 ft. will produce 12,800 tons of ore. A 10-stamp mill would crush this in a year; and as a mine cannot be expected to open up much more than a level a year, the capacity of the mine in question is therefore limited to 10, or, at the outside, 15 stamps. We will allow the ore a recovery value of $10.75 per ton, and a net profit of $3.75. We will assume that this ore-shoot, being 600 ft. long, will carry pay-ore to 600 ft. deep. To that depth it will produce 76,800 tons, and at a net profit of $3.75 a ton, will earn a total profit of $288,000. But against



TOWN OF SALISBURY, RHODESIA.

this has to be set the purchase of the mine, and its equipment. These two items will come to a figure which, set out at compound interest, will easily exceed, by the time the mine is exhausted, the $288,000 profit which the mine is expected to produce. There is therefore no real profit from the mine at all, and unless the pay-ore holds down to the depth estimated, there will be a considerable loss. This is a description of what I would call a typical Rhodesian mine of the better class and corresponds with the dimensions and values of a number of mines I have inspected there—except that I cannot guarantee the pay-ore in the mines lasting to 600 ft.

It may amuse American mining men to learn that Rhodesian mines of this class are valued to-day on the London market at anything from $500,000 to $2,500,000; but of course the better informed investor does not go into this sort of venture.

Rhodesia may fairly be described as a country of 10 or 15 stamp mines. If these are analyzed it will be seen that they are not likely to return the money sunk in their equipment—let alone give a clear profit. This is, no doubt, the fate of the average quartz mine all over the world.

It is only fair to say that a few of the mines promise to do better than this. The Selukwe mine has produced consistently for five years, and has now reached an output of 4,500 ounces a month. The Globe and Phœnix is also yielding about this figure, but its ore reserves are small. New mines that give fair promise for the future are the Ayrshire, Jumbo, Penhalonga and Sabiwa, which have all got big ore-bodies, averaging probably 10 ft. wide. These six mines represent the pick of the country, and will possibly return moderate dividends; but their market value stands out of all proportion to the profit in sight. That is indeed the keynote of the whole Rhodesian position.

Coal exists in many parts of South Africa. The most valuable field, commercially, is that which lies at the east end of the Witwatersrand; from here nearly all the gold mines are supplied. This seam is of great width. Three boreholes put down on one of the mines showed coal averaging 42 ft. 9 in. thick, and it has been proved up to 100 ft. in places. The lower 10 or 12 ft. is usually mined; this produces, after sorting, a moderate steam coal. There is evidence that this East Rand coal field is of limited area, and it is probable that in a few years the mines

will have to bring their coal from a greater distance—I suppose from Middleburg. The Middleburg coal-field covers hundreds of square miles of the high veldt of the Transvaal, and its supply of coal must be almost inexhaustible. Its coal is of better quality than the East Rand coal, but the difference is not great enough to balance the cost of an extra 100 miles of haulage, and up to the present this huge coal-field has had no commercial value. Attempts have been made to carry Middleburg coal to Delagoa Bay, to supply the shipping demand, but this has not been a success. The demand is limited; if one mine had the contract to supply Delagoa Bay it might earn a profit, but with a dozen competitors in the field the profit vanishes. It must be remembered, too, that this coal is hardly up to the standard of steamship requirements. This district is now supplying the railways with coal. The Natal coal-fields have a better average coal. They are too far aft to supply Johannesburg and have to send their product to the port of Durban. Here again there is a limited demand, and over-competition; most of the collieries will have to go to the wall.

The Wankie coal-field in Rhodesia is to be connected by rail with the gold mines this year. I have never seen this mine, which is stated to have the best coal in South Africa. It lies several hundred miles from the gold-fields, and I hardly see how coal can be laid down at the mines cheaper than the firewood they now burn. However, the Rhodesian railways will benefit. There are coal-fields also in Zululand, the Orange River Colony and Cape Colony. It is only in the last-named country that the supply is really limited.

There is no silver mined in South Africa, nor lead, nor zinc. The actual production of copper has been small and has mostly come from two mines—the Cape Copper and Namaqua Companies' properties—situated on the almost uninhabitable West Coast. In addition to these mines rather extensive deposits are known to exist in Damaraland, further north. These belong to the Southwest Africa Company, and their value is placed beyond doubt by the reports of several reliable engineers. A syndicate of English and German capital is about to start a railway to reach these deposits, and in a few years they are likely to rank as large producers.

In the last year or two a series of copper deposits has been found in Northern Rhodesia and the Congo State. These are of great size and at the surface show wonderfully high copper values, but what their value at depth may be is as yet an open question. It must be remembered, too, that these deposits lie from 400 to 900 miles from a railway. Even if they hold good in depth, this fact must be set against their commercial value.

For the last fifteen years the De Beers Company has controlled the South African diamond mining industry without opposition. Its five great mines at Kimberley lie within a radius of a few miles. The only other payable mine is Jagersfontein, 90 miles distant, which produces the best stones in Africa, but this, too, is under the indirect control of De Beers. The reserves in these mines assure the present output of diamonds for many years to come; in fact, if the De Beers Company wished, it could double its output, and so overload the market that diamonds would become a drug! But within the last few weeks a fact of great interest has happened in the diamond mining industry. Since the war a new "pipe" has been found, in the Pretoria district of the Transvaal. This mine is called the Premier, and it is now known, as the result of drilling, to be far bigger than any of the Kimberley mines, and carries more carats to the hundred loads than De Beers. The only point undetermined is the quality of the Premier stones; but if this is satisfactory De Beers will at last have found a powerful rival which it will have to get rid of; and for this purpose even its great reserve fund of $7,000,000 will be too small a figure.

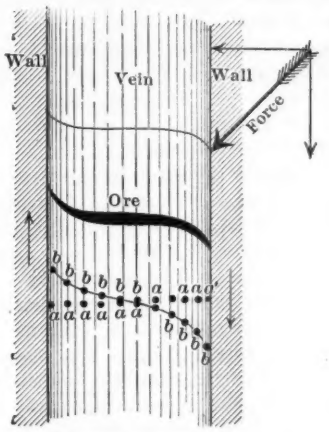
Extreme views are never just; something always crops up which disturbs the calculations formed upon their data.

CROSS-VEIN ORE-SHOOTS AND FRACTURES.

By W. H. WEED.

Various authors, in describing ore-bodies, have noted the presence of quartz lenticules along fractures whose course is oblique to the trend of the ore-body, or vein. In certain mines, seen by the writer, these transverse quartz bodies constitute the pay-ore; in others, the transverse fractures play a prominent part in the extraction of the ore. Notwithstanding these well-recognized facts, the true significance of these cross-fractures and these quartz lenticules seems to have escaped attention, though they appear worthy of especial recognition by reason of their scientific and economic importance. The accompanying figure is an ideal one, and represents a generalization from cross-sections of a number of veins actually observed. It represents a transverse vertical section across a vein whose walls are well defined. The vein-filling, which may be a simple or a complex mixture of auriferous quartz, pyrite, or other materials, or a dike of solid igneous rock, is represented as a solid mass.

Lateral movement along veins is a common phenomenon, usually marked by breccias, slickensides, etc. If, however, we assume a lateral movement, the vein walls being displaced in the direction shown by the arrow seen in the figure, the walls of the vein



a = original position.
b = new position.
Small arrows point in direction of movement.

may show slickensides and fault-breccias. At the same time the stresses developed in the vein-filling will cause curved cracks or fissures, which, in reality are merely planes of fissuring nearly normal to the vein walls, but which may develop by further strain into open cavities; these, when penetrated by later mineral solutions seeping through the fractured vein, become filled by auriferous quartz or other material. Such fractures cross the vein nearly at right angles to the vein-walls, but in many observed instances curve sharply when close to the wall and merge into the wall parting. In the gold veins of the Appalachian belt quartz lenticules occur in this manner at many mines. They are often rudely S-shaped, and though they may be several inches thick in the center of the vein, they taper to a point as the ends curve into the wall. Where well developed, they form the "gash-veins" of some writers, though they do not conform to the usual definition given of that old type of vein. Their cross-course and their occurrence inside of well marked vein walls or shear zones should properly exclude them from that class of deposits. In some cases, as, for instance, the flat fractures common in the great pyrrhotite bodies at Ducktown, Tenn., this structure is only shown by a simple crack, which is sometimes, but not always, marked by films of quartz, calcite or other minerals. In the upper levels of the Union Copper Company's mine at Gold Hill, North Carolina, descending solutions following vertical fractures have seeped off into these accompanying laterals or spurs and deposited sheets of native copper. At both of the localities noted above careful observation showed a connection between vertical and transverse fractures. The ore deposits of the Canton Mine, in New Zealand, as figured and described by Rickard, seem also to correspond to this type. Such fractures do not always extend clean across the block between the faults, but may extend out into it from either wall as feeders or droppers of the vertical fracture. Moreover, if a plate of country rock alongside of the vein is strained, similar cracks may run out into it. Where secondary and enriching solutions descend along such fractures in a primary ore deposit, enrichments of native metals, or oxides, or carbonate may form in the upper part of the vein, and masses of secondary sulphide may appear in such fractures at greater depth. Where the vein proper traverses schistose rocks the structure is modified, as the folia of the schists tend to tear apart, especially if the course of the vein is nearly the strike of the foliation. In this case the cross-fissures would tend to further tear apart the platy vein-filling and form tapering sheets conforming more or less to the original foliation. This structure is very common in the Appalachian veins, and is one which is usually attributed to a sheeting of the interfault space.

The dynamical explanation of such cross-fracturing of a vein demands that the force be an oblique one, as shown in the figure. Force applied in the direction of the arrow would produce a vertical sheeting of the vein parallel to the fissure walls and a system of master joints at right angles to it. This joint formation is discussed by Becker in a number of his papers.

It is not necessary to suppose any torsional strain, inasmuch as the resolution of forces shown by the figure is quite sufficient to account for such cavities. It appears probable that these cross-fissures are due to strain cracks developed by a differential movement of the vein-walls, by which the right-hand wall of the vein, shown in the figure, would go upward and the left-hand wall move downward, producing a straining of the block between the walls. This would tend to produce a sheeting of the vein-filling with the point of end movement in the center of the vein and of cross movement alongside of each wall. Such are the conditions indicated in the figure, in which the points marked "a" indicate the original position of particles in a horizontal plane, and the points marked "b" indicate the new position of the particles. Inasmuch as ore-bodies of this character are not of uncommon occurrence, and in many instances the quartz lenticules formed in such fractures constitute the only workable ore in the vein, their recognition as a distinct type seems desirable. If the writer is correct in his hypothesis as to their manner of formation, it follows that they are of secondary formation—that is, of later age than the primary vein-filling—and, therefore, that the ore contained in such fissures is of secondary formation and most probably derived from the primary vein-filling. Of this, however, the writer's studies as yet afford no positive proof.

WORLD'S PRODUCTION OF GOLD BY THE CYANIDE PROCESS.—In a paper read before the International Congress of Applied Chemistry at Berlin in June, 1903, Mr. George T. Beilby presented the following statistics of the quantity of gold produced by the cyanide process:

Year.	Transvaal, oz.	United States, oz.	New Zealand, oz.	Mexico, oz.	India, oz.	Australia, oz.
1891..	35,000	.....	.....	.....	.....	.....
1892..	175,000	.....	.....	.....	.....	.....
1893..	330,000	.....	38,160	.....	.....	.....
1894..	600,000	.....	86,728	.....	158	.....
1895..	655,000	75,000	68,354	4,053	3,177	.....
1896..	770,000	135,700	119,091	9,931	5,364	.....
1897..	825,000	190,000	263,076	10,207	18,798	308,000
1898..	950,000	245,840	422,418	49,170	30,440	398,074
1899..	900,000	428,400	496,900	48,832	35,776	545,563
1900..	85,000	497,280	452,524	47,936	59,414	683,899
Total.	5,325,000	1,572,220	1,947,251	170,129	153,127	1,935,536

Unfortunately the above statistics appear to be reported in terms of bullion, and not of refined gold, which prevents an accurate comparison, but even as a rough approximation they are of great interest.

THE TREATMENT OF BROKEN HILL SULPHIDES.

By Alec. A. Beadle.

The complex sulphide ores to be considered are those in which lead, zinc and silver constitute the most important ingredients. The well-known Broken Hill lode, in New South Wales, is the type of such deposits, both in its size and mode of occurrence. The Broken Hill lode occurs as a "saddle reef," the top of which has been eroded and weathered, so as to form a gossan or oxidized cover. This cover, although at one time probably carrying essentially the same metals as the lower part, is nevertheless so different in its composition and constitution now, that it has been removed and worked until only the unoxidized, or original and lower portions are left. These consist of argentiferous galena and ferruginous zinc blende with a gangue of garnet, rhodonite and feldspar, together with various impurities such as arsenic, copper, etc., and a small trace of gold, probably carried with the silver. It appears that these minerals were deposited together, for although the crystals of each ingredient are clearly visible, yet they are so intimately mixed and so finely crystallized in the bulk of the ore that they are not successfully amenable to separation by the ordinary concentration processes. Even if the ore be crushed to pass a 60-mesh sieve, some of the crystals of one mineral will often enclose portions of another.

The average composition of the ore may be taken to be as follows: Lead, 18 per cent; zinc, 20 to 25; iron, 6; sulphur, 20; gangue, 25; silver, 10 to 15 oz. per ton, and gold, 2 or 3 dwt. per ton. This leaves about 10 per cent to be made up in moisture, manganese, magnesia, alumina, arsenic, antimony and other impurities.

At present the bulk of this ore is concentrated at the mines into three products, only one of which is of marketable value. This is called "concentrates," about one ton of which is obtained from every five tons of crude ore, and contains about 60 per cent lead, 10 zinc and 31 oz. of silver per ton. The introduction of magnetic concentration has improved matters. The ferruginous blende, having itself a much higher magnetic permeability than the other minerals in the ore, is capable of being withdrawn, and blende has thus been obtained representing 50 to 75 per cent of that in the ore and containing 45 per cent zinc, 8 to 10 lead, and 5 to 10 ozs. of silver per ton. It is a well known fact in metallurgy that lead and zinc cannot be economically smelted together, for if both exist as oxide, as, for instance, in a roasted complex ore, then the distillation of the zinc is seriously interfered with by the disastrous action of the lead on the retorts, and the smelting of the lead is interfered with by the infusibility of the slag and the blocking up of the flues by zinc oxide. This is, however, only one way of looking at the difficulty, for by the use of suitable fluxes nearly the whole of the lead and silver can be run down in a furnace and the zinc obtained in the slag from which it can be reduced. But the cost of such a method is prohibitive and the ore is better left alone. These difficulties arise, no matter how rich the complex ore may be in metallic contents, so long as the lead and zinc are in approximately equal proportions. If, however, either the blende or galena be in large excess the mineral can be treated economically. If, for instance, the galena is in excess then it can be treated for lead, the zinc present still interfering, but causing a loss in the yield of lead only. Or again, if the blende be in excess, then the ore may be distilled for zinc, but loss in the yield of zinc takes place and additional trouble is caused by the extra deterioration of the retorts. It is obvious, then, that the purer the blende or galena the more its value, and the presence of one in the other, although adding to the value of its metallic contents, nevertheless detracts from its value to the smelter. Thus it is that the smelter pays for such ores on a sliding scale, in which he assumes a certain value per unit of lead or zinc in pure galena and blende respectively and subtracts from the total value thus arrived at, so much for each unit of the other mineral present, so that when these minerals are present in equal proportions the value of each neutralizes the value of the other and the smelter will not touch it.

The miner is then confronted with the unpleasant fact that, although he is finding in large quantities an ore which contains metallic value to nearly $30 or $35 per ton, yet the smelter will not buy it of him. It is then that the miner resorts to concentration of his ore at the mine and thus produces, for every five tons of crude ore raised, about one ton of concentrates, which he sells as a lead-silver ore, the rest being scrapped at the mine as a valueless zinc-lead ore. In this way the miner raises five tons of ore with a total metallic contents of perhaps $150 or more and has to content himself with a fractional profit. He then sends the concentrates, only, on their expensive journey to seaboard and over ocean, whereas the carriage of his five tons of crude ore would have outweighed their value. He is therefore doing his best to keep his mines open until a suitable process can be devised to smelt the ore direct, obtaining the whole of the metallic contents. To reduce either the lead or zinc alone and waste the other metal would be insufficient, as it would only then pay for the carriage, but if both metals could be fairly completely obtained simultaneously, there would be a large margin of profit, even if it were smelted in the States or in Europe. These ores exist in abundance not only in Australia, but in America, Europe, Great Britain and elsewhere.

This constitutes the main feature of the problem, but does not suggest any way of overcoming the difficulties. The first way in which it has been attacked with more or less success is by concentration, as referred to above. Two products have thus been obtained, impure galena containing blende, and impure blende containing galena, both of which are bought by the smelters. But this represents only the best aspect of the case, for, while the concentrates above referred to are exceptionally good, they cannot be obtained without the simultaneous production of a very large amount of 'tailings,' which, although poor, carry away a large part of the metallic contents in such a condition as to be useless to the smelter. Moreover, the cost of concentration is heavy and the result depends, as already shown, on the fineness of the interlaced crystals, which varies considerably in different parts of the Broken Hill lode; they are often so small as to cause great trouble in concentration. Thus an expensive process is performed to produce a concentrate whose value to the smelter is not that indicated by its actual metal contents but is much lower, and thus all at the expense of a large proportion of the metals which are literally scrapped. Concentrating therefore does not afford a final solution of the problem. A direct solution, and an ideal one, would be a process to treat the complex ore direct, obtaining the whole of its metallic contents at a reasonable cost. It will be seen that there are two ways of smelting such an ore which may be said to contain roughly 40 per cent of marketable metallic contents. We may take it that the value of such an ore is about $6.25 less at the Australian seaboard than at Swansea. Taking a batch of 100 tons of ore and smelting it in Australia and then bringing over 40 tons of lead and zinc to Swansea would cost $250 for carriage. Smelting the same ore at Swansea would, however, cost $625 for carriage or $375 in excess of smelting at the Australian seaboard, that is $3.75 per ton. It would thus seem best to smelt in Australia, but here we must remember that it depends entirely on the nature of the process; if it requires much coal, complicated machinery and expert supervision, it might pay to smelt at Swansea. If the relative cost of smelting shows an advantage of more than $3.75 per ton of ore at Swansea, then it is obvious that the latter is the place best fitted. The same would apply to smelting in America or in Europe.

How far an ideal process of this kind has been realized it is difficult to say, but there is little doubt that fundamental principles have been dragged to light which will ultimately lead to a successful process.

The attempts which have been made involve several principles which may be mentioned in this order. Ellerhausen originally mixed the complex ores with oxide of iron or manganese and carbon, and heated the mixture in a furnace, when lead, zinc and sulphurous acid fumes were evolved and were carried, together with the furnace gases, into a chamber, where they met with air and steam which converted them into soluble zinc sulphate and insoluble lead sulphate. The former was treated for the recovery of zinc by electrical methods or for production of zinc oxide and the latter smelted for its lead. The process was afterwards somewhat modified. Another attempt has been made by Sulman and Picard and is almost on the lines of the combined ordinary zinc and lead smelting processes; the roasted ore is made into briquettes with an excess of porous coking material and is put into the zinc distillation retort, when the whole of the zinc is said to distill off, leaving a porous briquette behind, containing the lead and silver which has not come into sufficient contact with the retort to destroy it. These zinc-freed briquettes are then smelted in a blast furnace to reduce the lead and silver. The first of these processes is complicated in the extreme and does not seem to have solved the problem altogether; the second process, it would seem, is subject to all, or even more, of the losses inherent in the separate extraction of lead and zinc from a comparatively poor ore. It entails two extraction processes, a preliminary roast and subsequent refining and desilverizing of the lead, and, although a marked improvement on what has been done before, it leaves a great deal to be desired.

There is another principle which it would take much too long to enter into here, that has been developed by several inventors in Germany, in England and in the United States, notably by Swinburne and Ashcroft in England. It involves the conversion of the complex sulphides directly into chlorides by the interaction of chlorine at a high temperature and the subsequent electrolysis of the chlorides. The extreme amenability of fused chlorides to fractional electrolysis and the completeness of these reactions make them at least interesting from the point of view of the Broken Hill sulphide problem.

METALLIC BARIUM.—Pure metallic barium cannot be obtained by any of the methods heretofore described, but Guntz reports (*Bulletin* Societé Chimique, 1903, XXIX, pp. 483-490) that it may be obtained by the distillation of barium amalgam in a vacuum with certain precautions. An investigation of the properties of pure barium shows it to be a tin-white metal, slightly harder than lead, of 3.8 specific gravity at 0° C., which melts at about 850° C., is distinctly volatile at 950° C. and boils at 1150° in vacua. Upon exposure to air it oxidizes rapidly; it decomposes water with evolution of hydrogen. When fused, it alloys with all metals except iron It dissolves easily in absolute alcohol.

BOILING POINT OF METALS IN HIGH VACUA.—In the high vacuum of the cathode light quartz vessels can be heated safely up to about 1400° C. F. Krafft (Berichte d. deutsch Chemiker Gesellshaft, pp. 1690-1714) has determined the boiling points of certain metals when heated in such high vacuum. The boiling points depend upon the weight of the superincumbent column of vapor. Zinc boiled at 545° to 560° C., while the heighth of the vapor column varied from 60 to 135 mm. Under similar conditions bismuth boiled at 995° to 1045° C., antimony at about 735° C. and lead at 1140° to 1173° C. Silver, copper, gold and tin were volatized with difficulty.

WATER IN THE MINES OF CRIPPLE CREEK.

By VICTOR G. HILLS.

The annual rainfall in the Cripple Creek district is small. The main range of the Rocky Mountains, situated to the west, precipitates the greater portion of the moisture. No records of the rainfall at Cripple Creek have ever been kept, and the records of Pike's Peak, Colorado Springs, Pueblo and Cañon City would not apply. The rain comes mostly in the form of torrential showers, a large portion of which passes off by surface drainage. The snowfall is light, and most of it is absorbed by the dry air as it melts.

The mountain mass of Pike's Peak, the summit of which is 8½ miles northeast of the mines, forms the only ground of the region which lies at a greater elevation than the hills of Cripple Creek itself. The formation of Pike's Peak is granite, which is quite divert the drainage southward so as to form West hills on the west and south. The streams on this side turn to the south, one after another; they are separated by a succession of ridges which repeatedly divert the drainage southward so as to form West Beaver creek, which flows from the Cripple Creek district toward the southeast. Therefore, it does not seem likely that the water from Pike's Peak contributes to the groundwater of the mines.

The best evidence of the lack of a perpetual water supply in the district is afforded by the nature of the springs and streams. When mining began, the springs, few in number, scarcely afforded sufficient water to be called flowing, most of them being mere seepage water-holes. Cripple creek and Wilson creek were scarcely large enough to be called living streams.

As a general rule, the groundwater elevation has a profile similar to that of the surface of the ground, but with much more subdued slopes; that is, rising with the hills and falling with the valleys, but coming much nearer the surface in the valleys than under the hills.

The sections, Figs. 1 and 2, on the next page, I have prepared from the topographical map of the United States Geological Survey. The profile is drawn from the summit of Pike's Peak southwest to the Lee shaft of the Isabella Company; thence to the nearest deep shaft to the southwest, the Findley; thence to the Blue Bird; thence to the Elkton; thence to the El Paso and Standard tunnel and to the confluence of Cripple creek and Arequa gulch. The view is looking northwest. On this section I have outlined approximately the original and present groundwater levels of the region.

As a foundation for any reliable investigation of underground water circulation, correct elevations referred to a common datum are the first essential.

My topographical work has determined correct elevations over the whole of Battle Mountain, and beyond that to the Standard tunnel. In obtaining the elevations of the principal deep shafts, I encountered some disagreements in the datum planes used. A few mines still use a datum purely assumed, such as calling the collar of some shaft 10,000 ft. Some mines had determined a sea level elevation by use of an aneroid, with results as close as can be expected by such a method; for example, the John A. Logan shaft was considered as 10,453 ft. above sea level, while as referred to the Portland datum it is 10,479—a difference of 26 ft. Most of the mining engineers have taken their elevations from some one of the railroad surveys. But the many railroad surveys and re-surveys, particularly those of earlier dates, have developed considerable disagreements, and the mines have taken their starting points from surveys of different lines and dates. For example, the Mary McKinney shaft, as used by the mine engineer, is 9,534.5, while referred to the Portland datum it is 9,540.3. Another cause of error in the figures which have been published and used with reference to water elevations, arises from the assumption that the mine levels are each 100 ft. apart, when they sometimes vary materially. Thus, while giving the Portland collar correctly as 10,089, the 8th level has been published as 9,289, while in fact it is 9,297. In the Moon-Anchor mine the elevations heretofore published have been about 10 ft. in error. The above figures are only examples to show the range of the discrepancies.

The datum used for elevations in this contribution, and called the Portland datum, was originally taken from a bench mark of the Golden Circle railroad; and it corresponds with the levels of the Colorado Springs & Cripple Creek District railroad. The United States Geological Survey is now doing Y-level work to establish bench marks over the district. These will be determined from the correct elevation established at Colorado Springs by the United States Coast and Geodetic Survey. The correction to the present standard, I am informed, will amount to about 15 ft.

Table of Elevations.

Name of Mine.	Sea Level Elevations. Collar.	First Water.	Present Water.	Sump.
Abe Lincoln	9,618.28	——	9,108	9,093
Ajax	10,115.17	——	8,913	8,885
American Eagles	10,756.54	——	——	9,256
Anchoria-Leland	10,146.46	9,493	——	9,036
Blue Bird	10,403.87	9,064	——	9,033
Clyde	10,092.43	9,586	——	9,280
Eclipse	9,696.24	9,546	9,344	9,190
Elkton	9,741.22	9,430	9,024	8,775
El Paso Consolidated	9,377.47	——	8,801	8,801
Findley	10,405.54	——	——	9,110
Gold Coin	9,771.80	9,403	8,663	8,572
Golden Cycle	10,072.82	——	——	9,173
Gold King	9,859.37	——	90	8,951
Independence Cons.	10,286.33	9,730	9,007	9,007
Isabella	10,467.15	9,557	9,455	9,339
John A. Logan	10,478.70	——	——	9,079
Last Dollar	10,285.00	9,065	——	9,010
Lillie	10,229.19	——	9,021	8,703
Mabel M	9,500.40	——	9,025	8,086
Mary McKinney	9,540.30	9,505	9,026	8,931
Midget	9,803.20	——	——	9,037
Moon-Anchor	9,871.73	9,496	——	9,037
Morning Glory	9,728.20	——	9,026	——
Orpha May	10,545.25	——	——	9,281
Portland No. 1	10,089.31	9,459	9,008	8,969
Portland No. 2	10,251.33	——	9,008	8,969
Portland No. 3	10,339.51	——	——	9,184
St. Patrick	9,622.37	——	8,977	8,910
Stratton's Independence	9,850.63	9,576	8,450	8,450
Strong	9,762.99	——	8,879	8,859
Vindicator	10,216.32	——	9,021	9,017
Wild Horse	10,059.05	——	——	9,574

Tunnel Elevations.

	Portal.	Breast.
Blue Bell	9,342	——
Ophelia	9,275	——
Standard	9,034	9,061
Newell	8,937	8,942
El Paso (under construction)	8,790	8,801

In a few cases, in the above list, the shaft itself is not sunk to the full depth given, but a winze in the same mine is added to the shaft depth.

Conditions at Present. June 3, 1903.

Name of Mine.	Water. Elevation.		Gal. per Minute.
Ajax	8,913	Pumping	5
Eclipse	9,344	Pumping	10
Elkton	9,024	Not pumping	—
El Paso Consolidated	8,801	Pumping	300
Gold Coin	8,663	Pumping, water partly plugged	740
Gold King	9,020	Not pumping	—
Independence Cons.	9,007	Pumping	70
Isabella	9,455	Stationary, pumping for boilers only	50
Lillie	9,021	Drained by Vindicator.	
Mary McKinney	9,026	Falling 0.03 ft. per day.	
Morning Glory	9,026	Falling 0.03 ft. per day.	
Newell Tunnel winze	8,941	Stationary.	
Portland	9,008	Falling 0.03 ft.	
St. Patrick	8,980	Not pumping. Stationary.	
Stratton's Independence	8,450	Pumping, water partly plugged	300
Strong	8,879	Pumping	200
Vindicator	9,021	Pumping	300
		Total	1,975

WATER RECORDS OF THE MINES.[1]

The "first water" elevations given above are not always to be considered as furnishing accurate information. For example ,the Moon-Anchor pumped for some time before its near neighbor, the Anchoria-Leland, had reached its first water level, therefore the original elevation at the Anchoria-Leland is uncertain. The Findley shaft is the same depth as the Independence Consolidated, but it never had any water, evidently because the latter drained the country ahead of the former.

[1]It would be impossible, manifestly, for any one to personally gather all of the data here presented, particularly the changing water levels in the various mines during the past few weeks, and I am under obligations to either the manager, the superintendent or the engineer of many of the mines for most valuable assistance.

The only mine-shafts whose "first water" can be at all relied upon to locate the original groundwater level at their respective locations are the Portland, Stratton's Independence, Gold Coin, Independence Consolidated, Isabella, Victor, Mary McKinney and Moon-Anchor, as given in the foregoing table of elevations

The original groundwater-level of Cripple Creek was at about altitude 9,500 for the west side of the district and considerably higher for the Bull Cliff region, as is proved by the foregoing list of shafts. The same fact is proved in a general way by the elevations of the springs.

The Blue Bell tunnel, at elevation 9,342 ft., continued to discharge about 200 gals. of water per minute for several years. Therefore it is evidently below the original water-level for Gold Hill.

All other shafts of the district are dry, and furnish no evidence regarding the present water elevation farther than to show that the water is not above their respective sumps.

The mines which have a natural water-level, that is, the horizon to which the water would rise if pumping ceased, are:

	Natural Level.	Pumping Level.
Ajax	8,965	8,913
Gold Coin	8,995	8,663
Stratton's Independence	8,947	8,450
El Paso Consolidated	9,035	8,801
Gold King	9,013	8,971
Strong	8,991	8,879
Eclipse	9,550	9,344

All other mines are without any means of determining their natural water-level, unless it be assumed that it is about the same as that of their nearest neighbor. For example, that of the Independence Consolidated may be assumed to be the same as the water-level of the Vindicator, but it is not known to be so with certainty.

The condition of stored water rather than moving or perpetual water, which has prevailed in this district from the very first, is indicated by the latest case in evidence, the Vindicator. This mine is evidently rapidly approaching the complete emptying of its basin to the level of its pump, just as did the Portland in the last months of 1899.

The Portland mine encountered its first water at elevation 9,459 ft., which, it will be noted, was lower than the first water of Stratton's Independence (9,576), yet later the Portland was obliged to pump heavily while the Independence and Strong worked at still lower points with but a trifling inflow. The Portland discharge did not exceed 300 gals. until after getting below elevation 9,385, when it rapidly increased to 700 gals. In recovering the 800-ft. level, after the drowning of the pumps, two 800-gal. bailing tanks were used. No records of discharge were kept in 1896, 1897, nor till May 7, 1898. The pumping record since this date is given in detail by the diagram, Fig. 3, on the next page.

In the Portland the natural water-level has followed the invariable rule of never having risen after it has once been lowered to any given level. The great water-course which has always been found near No. 1 shaft, and evidently runs in the direction of the Anna Lee shaft, cannot extend far to the south because the Strong and Independence together have quite thoroughly crosscut the country in that direction without disclosing it. The failure of the water to ever find the same level in the Portland and Stratton's Independence is the more noteworthy when it is considered that certain large ore-bearing veins and dikes cross the line, and have extensive stopes on both sides of the boundary separating these two large properties.

The Bull Hill mines are almost entirely without any water history worthy of note. Whether Bull Hill originally contained any considerable quantity of water of the same elevation as either the Portland or the mines on the west side cannot be shown, because none of the shafts of that hill went deep enough to make the discovery at a sufficiently early date. The Last Dollar has never pumped water. In 1902 it struck a little at 9,017, but this has receded until its sump at 9,010 is dry. This elevation would

indicate that the Last Dollar has its basin common with the Portland and not with the Vindicator or the Elkton. The Blue Bird sunk only to a depth of 600 ft. prior to about January 1, 1901; on January 1, 1902, the sump was at elevation 9,154 without ever having seen any water. In March, 1902, water was struck at 9,064. The shaft was continued to elevation 9,033 ft. On April 1 the water was allowed to rise, and stood at about 9,064. It gradually receded, leaving the sump in August, 1902, elevation 9,033 ft. The El Paso Consolidated, on Beacon Hill, had allowed its water to rise to the level of the Standard tunnel until a few weeks since; the water is now lowered to the 600-ft. level, elevation 8,801, where it discharges 300 gals. per minute with bulkheads restraining the main flow.

The Blue Bell tunnel was the first development of water in the Cripple Creek district. It continued to discharge steadily for several years.

The Ophelia tunnel was an important factor in the drainage of Gold Hill. There seems to be no record of its discharge, but from observation I have estimated it at 2,000 gals. per minute for more than a year. It decreased gradually to zero in 1898.

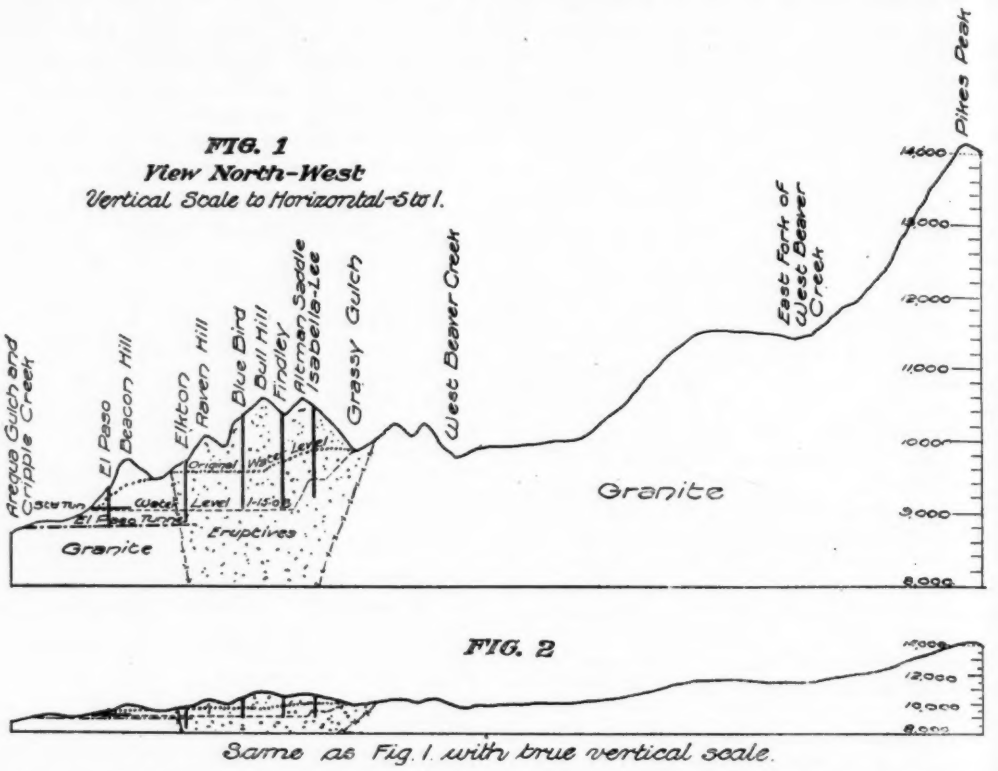
The Standard tunnel was not continuously driven, and its water was developed at numerous places with varying intermissions. Hence its discharge record is not so interesting and instructive as it would otherwise be. It began to discharge 1,000 gals. per minute in 1898, and reached its maximum, 12,000 to 18,000 gals., in 1899, and was entirely drained before the end of 1901.

The Newell tunnel is driven from Arequa gulch east into Grouse mountain, a distance of 1,090 ft. At 988 ft. from the portal a branch runs northeast following a vein and a phonolite dike in the direction of the Prince Albert mine. The breast of this drift is now about under Arequa gulch. This tunnel is driven on the best grade of any in the district, being 1 in 384 and regular throughout. At the portal it is 97 ft. lower than the portal of the Standard tunnel, but owing to the difference in grade its breast is 119 ft. lower than the breast of the Standard. The Newell tunnel has never produced any important flow of water, but a winze on the large vein stands full of water to the tunnel level (elevation 8,941 ft.). It is the lowest in elevation of any tunnel in the district which at this date has been driven to any length worthy of consideration.

The theory of a common water-level throughout the Cripple Creek region has been much advocated, the idea being that the volcanic rocks constitute a much-fissured mass containing the water which it held within the granite rim as an impervious basin. The facts which justify this view are that the Rebecca, the Anchoria-Leland, the Moon-Anchor, the Midget, the Mary McKinney, the Morning Glory and the Elkton, with possibly some others in that vicinity, have each, at some time in their history, had their water-level lowered without pumping and, further, that the water elevation at all of these mines, so far as can be determined, has been about the same at the same dates ever since pumping began. The Caledonia, although located in the granite far outside of the eruptive rocks, is said to have also maintained a common water level with the other west side mines.

The Portland mine pumped large quantities for years, while its nearest neighbors, the Independence and the Strong, worked at much greater depths with scarcely any water. This condition may be explained by the fact that the Independence and Strong are in the granite. But some further facts are not so easily accounted for.

From February 1 to August 1, 1899, the Portland



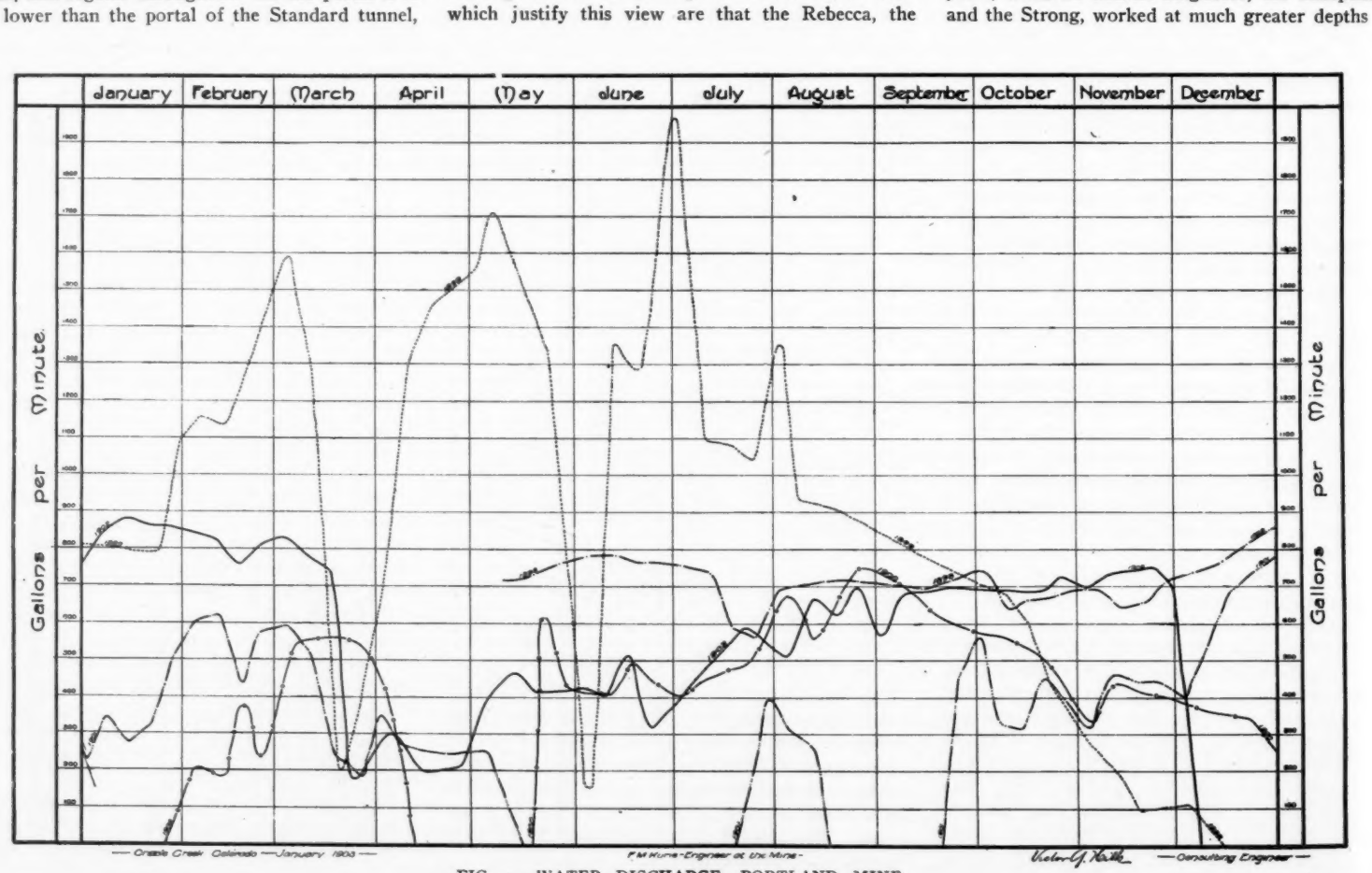


FIG. 3.—WATER DISCHARGE, PORTLAND MINE.

was pumping an average of 1,180 gals. at an elevation of 9,297. During June and July, while this discharge was at its maximum, averaging about 1,500 gals. per minute, the Elkton, its nearest neighbor toward the west side, was dry at 9,250 (47 ft. lower), the Mary McKinney at the same time was drained to 9,260, and the Moon-Anchor was drained to 9,248.

The Portland to-day—June 4, 1903—has its water 16 ft. *lower* than the Elkton, and with the Portland level falling at the rate of 0.03 ft. per day, from December 20, 1902, to date. It would seem that lowering of the Portland water level must be attributed to the pumping from the Stratton's Independence, the Strong and the Gold Coin.

The Ajax mine, about March 1, 1903, encountered water at 8,965—59 ft. lower than the water in the Elkton—and to-day has apparently a natural water level at about 8,913 ft.

The Eclipse mine presents the most inexplicable condition in the district. Its water level has been kept at 9,196 ft. by pumping about 20 gals. from September, 1901, to December 20, 1902; the pumps were stopped at the latter date, and the water is slowly rising. The Eclipse being located near a gulch, it is not at all strange that it should gather the water. But the strange fact is that the water should not find its way *out* of this mine when the Ajax, on one side and the Elkton on the other, are both dry at much greater depths. The Eclipse shaft is not in the granite but near the contact, and in no place in the district is the formation more thoroughly fissured and cross-fissured than in the Eclipse workings, with drifts and crosscut quite extensive at elevation 9,196 ft. The existence of the groundwater at this elevation at this point between the Portland and the west side mines, is one of the facts which discredits the theory of their having a common water level.

The Abe Lincoln mine, at the north end of the district, presents much the same conditions as the Eclipse.

The Clyde mine on the east side of Battle Mountain, and entirely in the breccia formation, pumped for more than a year, 1900 and 1901, from an elevationtion of 9,580 when its nearest neighbors, the Modoc, the Last Dollar and the Portland, were all without water at lower elevations.

That the Isabella and Victor have a much higher water level than the west and south sides of the District is well known—see table and Fig. 1. This shows that some of the volcanic rocks, at least, are quite as impervious as the surrounding granite.

That the water might assume a common level in neighboring mines when undisturbed for a long period does *not* constitute a common water level for practical mining purposes. Let us suppose that originally the groundwater throughout the district stood at the elevation of the lowest point in the surrounding granite rim, the surplus water discharging by a spring at that point. Further, let it be imagined that every pump in the district be stopped for several years, and that the water assumed a uniform elevation equal to the point where the Standard tunnel cuts the contact. This would beautifully establish the common basis theory; but it would not make a common water level from a commercial mining standpoint. If the passage of water through certain rocks is so slow that a mine is not emptied of water by its neighbor in reasonable time, it has not a common water level for practical purposes.

Most rocks permit water circulation to some degree. Certain sedimentary rocks, such as shales, are frequently quite impervious to water, either holding water down under pressure as at Pueblo, Colo., where by drilling a depth of 1,200 ft., mostly through shales, water is tapped which not only rises to the surface, but exhibits a considerable pressure, showing that the water below is confined under a load of some 600 lbs. to the square inch, or holding water up as in the cases of mines working dry below the level of the sea and beneath lakes and large rivers. Examples of such mines are not uncommon throughout the world.

The general theory of groundwater is that the size of the openings which contain and conduct the water gradually grow less with increasing depth. The depth at which all fissures and openings of any sort must be absolutely closed by the weight of rock above is variously estimated at from six miles to eight miles below the surface, the depth varying with the hardness and density of the rock.

The history of mining shows that the amount of water is more likely to decrease than to increase with depth. In many mines the greater portion of the water is caught in less than 500 ft. from the surface and the lower levels are worked with comparatively little pumping. This district has a few examples of such a condition on a small scale. The Independence Consolidated has a perpetual spring at elevation 10,050. The water is raised from one of the upper levels and no water enters the lower levels.

As examples of absence of water with depth: a large drill-hole was put down in West Virginia to a depth of 4,500 ft. The first 1,500 ft. produced water which, being cased off, left the lower 3,000 ft. entirely dry. A similar bore at Pittsburg, Pa., was put down 5,386 ft. Water was found and cased to 900 ft., and 4,400 ft. below all was dry. At the Przibram, Bohemia, deep mines, all water is caught above 2,600 ft. in depth. From this depth down to 3,600 ft. they are dry. The workings of the Calumet in Michigan at 4,000 to 5,000 ft. in depth are dry, the water being caught near the surface.

Leadville, Colorado, and the Comstock district afford examples of mines which were wet, and continue to be wet to the greatest depth yet reached. From both the general law of the decreasing size of open fissures with depth, and the fact that the area of the most fractured rocks in this district grows less with depth, together with the history of Cripple Creek water and the climatic reasons, it is fair to conjecture that the amount of water will gradually become less at lower levels.

INTERNALLY FIRED BOILERS.

Internally fired boilers of the Scotch type are finding increased use in the United States for general purposes of steam generation. Many of the newer metallurgical plants are equipped with this form of boiler. It is somewhat more expensive than the ordinary horizontal return tubular boiler, allowing for the brick setting of the latter, which the internally fired boiler does not require, but the additional cost is not so high as to offset the advantages in many cases.

Among the advantages of the internally fired boilers is safety against explosion. It is said that there is no case on record of the explosion of a boiler of this type. The boiler, not being enclosed in brick work, is subject to inspection from the outside at all times, and the plates of the shell are not exposed to the direct heat of the fire, wherefore there is but little deterioration in the plates of the outer shell or the joints thereof. The danger of bagging sheets, which is apt to occur in any externally fired boiler, due to an accumalation of scale or sediment on the fire sheet, is also eliminated. The lower part of the internally fired boiler is not exposed to the fire at all, and any deposits collecting in the form of a slush or mud are readily blown out. It is claimed also that the tendency for scale to adhere to the furnace is reduced to an extent that will not cause any trouble, the expansion and contraction of the corrugated surface of the furnace having the effect of loosening the scale. With respect to the small fire tubes, the conditions of the internally fired boiler are substantially the same as those of the ordinary horizontal return tubular type.

The chief advantages of the internally fired boiler are economy in fuel and lower cost of maintenance. The saving in the latter respect may be expected in almost all cases. There is no brick setting to maintain, and, as stated above, there is less likelihood of deterioration in some of the parts of the shell. The saving in fuel is determined by the fact that the fire is entirely surrounded by water to be heated, wherefore no loss is suffered through radiation from the fire-place. With many kinds of fuel this may constitute a rather important advantage. This advantage may be offset, however, with poor grades of coal by the limited volume of the fire-place, which does not afford sufficient space for the gases to mix in order to insure complete combustion before the temperature is cooled below the ignition point.

The internally fired boiler is attractive because of its neat appearance in place and the simplicity of erecting it, the boiler being delivered in a complete condition and requiring nothing but a few small piers for its foundation. The floor space required is also somewhat less than for the ordinary return tubular type.

The advantages of the cylindrical boiler, with internal corrugated fire-box, and its superiority to the ordinary locomotive type boiler have been recognized by railroad men. The use of such a boiler for a locomotive was first suggested by Mr. Bela Ambrosovics on the Hungarian State Railroads about fifteen years ago. The idea was taken up by Herr Lentz, on the Prussian State Railroad, and Herr Scheffler, on the Saxon State Railroads, about 1891, and at about the same time Mr. George S. Strong used it in an experimental locomotive built by the Rhode Island Locomotive Works. Mr. Strong's idea was not a success, but its failure was due to other causes than the fire-box. The plan was taken up again by Mr. Cornelius Vanderbilt, Jr., on the New York Central, some two years ago, and since that time boilers of this type, with corrugated fire-boxes, have been built for a number of roads, and have proved highly successful. We may add that this type of boiler is especially adapted for the use of liquid fuel, which is becoming quite common in California and in the Southwest.

PLATINUM PRODUCTION IN 1902.

According to the report prepared by Dr. Joseph Struthers for the United States Geological Survey, the production of platinum from domestic ores in the United States decreased from 1,408 oz., valued at $27,526, in 1901—the largest output recorded by the Geological Survey since 1880—to 94 oz., valued at $1,814, the smallest production since 1893. In connection with the platinum there were also obtained from the ores 20 fine oz. of iridium, as against 253 oz. in 1901. The domestic supply of platinum in recent years has been obtained as a secondary product chiefly from gold placer deposits in Trinity and Shasta counties, California. It is reported that the metal occurs, though not in commercially rich deposits, in many other gold placers of California, as well as in Washington, Oregon, Idaho, Montana, Colorado and Alaska. The Rambler Mine, Wyoming, continues to attract attention, and during the year a considerable quantity of the metal was collected, but not marketed, by the Waratah Minerals Company at Kerby, near Grant's Pass, Josephine County, Oregon.

The Russian sources of platinum supply, which furnish about 90 per cent of the total consumption of the world, are comparatively limited. The platinum-bearing ores extend along the eastern watershed of the Ural Mountains in Eastern Peru and along the watershed farther south.

The imports of platinum into the United States during 1902 were valued at $1,987,980 as compared with $1,695,895 in 1901.

DETERMINATION OF SULPHUR IN PYRITES.—In a report of a committee of the Chemical Society of Northern France to the 5th International Conference of Applied Chemistry, recently held at Berlin, Lunge's method of determining sulphur in pyrites by oxidation with aqua regia, repeated evaporation with hydrochloric acid and separation of the silica, precipitation of iron with ammonia, and precipitation of the sulphur from the filtrate by means of barium chloride was recommended as the best, but it was recommended that the precipitation of ferric hydroxide should be washed until the bulk of the filtrate amounts to 500 c. c. or rather more than is prescribed by Lunge.

THE ORE DEPOSITS OF ROSSLAND, BRITISH COLUMBIA.

By Bernard MacDonald.

On account of its large production of gold-copper ore, Rossland is entitled to be considered one of the important mining districts of the Rocky Mountains. The principal claims were located in the early nineties, but little work of a systematic nature was done until the railroad tapped the district in 1895. From that time development was rapid, and the mines became large producers. So far, the crude ore, as mined, has been smelted in copper matting furnaces without preliminary dressing, except hand sorting.

During 1900-1901 the writer was manager of the Le Roi mine, and during the same years and in 1902 he was also manager of the Le Roi No. 2 and other groups of lesser note in Rossland. Within these years development work aggregating 28,500 linear feet was done on these groups and about 500,000 tons of ore were extracted from them. Of this tonnage 400,000 tons, having an aggregate gross assay value of about $14 per ton, have been shipped and smelted, yielding a substantial profit. About 100,000 tons, or 20 per cent of all the ore, as mined, were sorted out by hand and stored at surface as second class ore, to await some method of treatment cheaper than direct smelting.

Rossland is situated in British Columbia, approximately at a point six miles north of the international boundary (49° N. Lat.) and about 118° W. Long. It is reached by branch railways from the Great Northern and Canadian Pacific railway systems.

The rocks of the district form a volcanic complex, consisting of a central area of gabbro and monzonite surrounded by porphyrites, andesites, diabases, tuffs, agglomerates, etc. The gabbro and monzonite graduate into each other and constitute the core of an extinct volcanic cone, on the eroded surface of which the veins outcrop and the town of Rossland now stands. The present exposure of these central rocks is roughly oblong in shape, covering an area which measures about 25,000 ft. in length from east to west, by about 6,000 ft. in width from north to south, and is locally known as "the gabbro area."

In 1897 the district was surveyed by R. G. McConnell, of the Geological Survey of Canada, who describes the formations as follows:

"The gabbros have a more or less distinct diabasic structure in places, and vary considerably both in texture and composition. They occur, as a rule, as a medium-grained, little altered greenish rock, consisting of plagioclase, pyroxene, biotite, iron sulphides and occasionally quartz in appreciable quantities, with uralite and epidote as the principal alteration-products. A coarse-grained pegmatitic variety occurs in patches along the northern border, and irregularly shaped areas, more acidic than the ordinary form, are of common occurrence. The gabbro area is important from an economic standpoint, as most of the larger lodes of the district are situated either on or close to its border. . . Near Rossland the porphyrites and associated rocks have been brecciated, and farther to the north on Stony and Murphy creeks, they have been crushed into a schistose condition. No precise line can be drawn between the gabbros of the Rossland district and the surrounding semi-crystalline porphyrites, etc., and it is inferred that both series represent portions of the same magma cooled under different conditions."

The topography of the district shows the effects of extensive erosion since the cooling of the volcanic rocks. This is manifested in the comparatively high mountain peaks separated by narrow valleys or low saddle-back ridges and the deep river-drainage in the near neighborhood of the mines.

The central, or gabbro, area has yielded more uniformly to erosion than the surrounding rocks, the latter being more siliceous and consequently better able to resist weathering. As a result, this area, which has an average altitude of about 3,500 ft., above sea level, is immediately surrounded by an amphitheatre of mountain tops, ranging in distance from ¼ to 2 miles and rising many hundred feet above it. The rocks constituting these hills are the porphyrites, tuffs and associated eruptives, many of which show distinctly the fluidal structure of the outpourings of the extinct volcanic, the core of which they now surround.

The mineral veins traverse the gabbro and pass from this into the surrounding formations. They are classed as "replacement veins" and have an easterly and westerly strike, a dip of about 70° to the north and range from a few feet up to 150 ft. in width.

The study of the habits of these veins, from their outcrops to depths ranging up to 1,000 ft., made in the light of recent literature on the genesis of ore deposits, leads the writer to interpret the principal phenomena connected with their origin, mineralization, etc., as follows:

Their origin is due to compressive strain exerted subsequent to the cooling of the volcanic rocks, which, exceeding the elastic limit of these rocks, produced a series of shearage zones extending throughout the district. These zones, now identified with the mineral veins, run approximately parallel to each other and about 250 ft. apart. Some, however, show a marked divergence in the continuance of their westerly strike, as they pass through the gabbro area toward the surrounding formations. After continuing a few hundred feet in these latter formations, the veins change strike, or otherwise lose their identity as continuations of those in the central gabbro area.

The shearage zones, as originally formed, consisted of the shattered rocks of the formations through which they passed; and it appears that immediately following the formation of these zones the process of mineralization was commenced in them by circulating waters, carrying the minerals in solution. These waters, circulating among the shattered rocks and along the walls, dissolved out, to a greater or less extent, the soluble rock minerals, and deposited, in their places, as metallic sulphides, the metals held by them in solution. Thus by this process the zones of shearage became the mineral veins of the district, and, by reason of their supposed origin, they are now designated as "shear zone fissures." But the pay ore-bodies were not yet formed in them. *Primary mineralization* only had been, so far, effected.

Dikes and Faults.—Following these effects, the district was subjected to strains that produced another series of fractures. These ran in a northerly and southerly direction, viz., approximately at right angles to those already formed, and which, at that time, as above described, represented the present mineral veins in their primary stage of mineralization. The later-formed fractures were very numerous, occurring frequently within a few feet of each other and seldom more than 200 feet apart throughout the district.

In their strike they cross the mineral veins and the enclosing rocks, and many of them extend for great horizontal lengths and to unknown depth. The fractures from which they originated must have reached the unsolidified magma, which rose up so as to fill them, forming the dikes which now traverse the district.

Such of the second series of fissures as did not reach the molten rock beneath, or, if reaching it, were closed too tightly to permit its entrance or passage through them (and these are the greater number), are now classed as *fault*-fissures.

COLUMBIA AVENUE, ROSSLAND, B. C.

The strike and dip of the dikes and fault-fissures are, in all cases, nearly parallel; the strike being northerly and the dip about 75° east. In some cases local variations in dip and strike are noticeable. One exception to this general rule is worthy of record. A small basic dike, ranging in width from a few inches to 2 ft., has been found, running for a length of from 200 to 300 ft., within the vein of the Number One mine. This dike, itself, contains no ore; although on one side or the other, and some times on both sides of it, high grade pay-ore is found. The probable solution of the formation of this dike is that the Number One vein was re-opened during the period in which the dike series of fissures was formed, and that such opening, extending laterally or vertically to molten rock, became filled and formed the dike.

It is noteworthy that the dikes in the district contain no ore whatever, not even when crossing through the richest ore-bodies; while, in contrast to this, the

country rock for many feet on either side of the veins is more or less impregnated with metallic sulphides. This is probably due to the fact that the dikes were formed subsequent to the primary mineralization of the veins.

Fault movements, shown by the displacement of the ore-veins, ranging from a few inches to many feet, occur along the dikes and fault-fissures. These lines of displacement yield most of the water encountered in the shallower workings of the mines. As depth is attained it is noticeable that the widths of the dikes generally diminish and their lines of contact with the country rock cease to yield flowing water, or even seepage.

Secondary Enrichment.—It is the opinion of the writer that immediately succeeding the formation of the dikes and fault-fissures came the period during which the secondary enrichment of the veins was effected. From an economic point of view, the work of this period was by far the most important yet done by nature. It was during this period that the surface waters, percolating down through the portions of the veins that were re-opened and crushed by the crossing of the dikes and faults, oxidized the metallic sulphides near their outcrops, and took up and carried away in solution the metals thus rendered soluble, and re-deposited them at a deeper horizon.

The deposition of the metallic ores thus, along these channels, formed the bodies or shoots of ore that are now mined.

It was during this period also that the rocks of the volcanic area were eroded and reduced to their present contour. The veins existing in the rocks that were thus worn away suffered the same erosion to an extent measured in many hundred feet of thickness; the stumps of the veins are all that remain. As the old outcrops would become oxidized and wear away, new ones would be exposed to meet the same fate. Thus the ores existing in the weathered outcrops would be oxidized, and their metallic contents would be leached out and re-deposited at greater depths. The continuance of erosion would again bring the ores thus deposited to the surface, and, again, by the processes described, they would be carried down to a deeper horizon. In this manner the ore-bodies mined to-day represent repeated concentrations of the lean primary ores originally deposited in the veins, and they are thus the result of secondary enrichment.

Characteristics of the Ore Deposits.—Commercially classified, the mineral deposits come under the head of gold-copper ores; mineralogically, they consist of an admixture of (principally) auriferous pyrrhotite, chalcopyrite, (sparingly) iron pyrite and arsenopyrite, and (rarely) molybdenite, galena and zinc blende. Silver occurs in the ore associated with all the minerals named, and most intimately with the chalcopyrite.

The ratio in which the metals of commercial value occur in the ore-bodies varies considerably in different parts of the district; but the following may be taken as an approximation: Gold, 1 oz.; silver, 2 oz.; copper, 3.5 per cent, or 70 lb. per ton.

It is noticeable that in the low-grade siliceous ores, which surround, or are mixed with, the heavy sulphide ores, the gold ratio increases. This was shown by general sampling of the low grade ore-bodies left standing in the mine and by large shipments of the second class ore-dumps, sorted out from former high grade shipments.

The gangue, as might be expected, is the country rock through which the veins pass, namely gabbro, monzonite and porphyrite. These rocks, when found within the veins, and, especially, within the ore-bodies, are more or less altered, traversed by stringers of calcite and quartz, and impregnated with crystals of the metal minerals. In the higher grade ores the alteration of the gangue is the most complete, and fragments of rock are found enclosed within an envelope of ore.

The payable vein-matter graduates into the country rock, becoming lower in grade, until the payable limit is reached without the intervention of walls. The transition from pay-ore to country rock is sudden where the latter is hard and massive, and gradual where it is crushed or decomposed.

The zone of oxidation, known locally as the "iron cap," extends only to the depth of a few feet below the outcrop of the veins. Immediately under this the rich sulphide ores begin, and continue to the depth of 500 ft. or thereabouts, where they commence to grow lean.

The material shipped to the smelters (which is the ore as mined, less about 20 per cent sorted out) varies considerably in value and character from time to time; but an approximate average analysis would run as follows: Silica, 45 per cent; alumina, 12 per cent; lime, 5 per cent; iron, 22 per cent; sulphur, 13 per cent; copper, 1.8 per cent.

Shipments in recent years are running higher in silica and alumina and lower in lime, iron, sulphur and copper, and are therefore lower in value.

The first shipments from the district were made in 1894. The tonnage shipped from that date to the end of 1902, by years, is as under:

	TONS.
1894	1,856
1895	19,693
1896	38,075
1897	68,804
1898	111,282
1899	172,656
1900	217,636
1901	283,307
1902	329,534
Total	1,242,643

The gross value of the metals in the ore shipped ranged from an approximate average of $40.00 per ton in 1894 to $13.00 per ton in 1902.

In addition to the above, the following characteristic features are noteworthy:

1. An impoverished iron cap at the outcrop of the veins, with rich, heavy sulphide ores, carrying a high percentage of copper, beginning immediately underneath it.

2. The sulphide ores continuing downwards, along or adjacent to the dikes and fault-crossings that reopened and shattered large contiguous areas of the veins subsequent to their primary mineralization.

3. The general occurrence of the metallic sulphides enveloping angular fragments of the country rock, or, alternating with solid streaks of this rock but slightly altered and sparingly impregnated with sulphide minerals.

4. The termination of the shipping ore in depth, in serrated outline of boundary, the points of which usually run down along the areas of the vein shattered by the dike or fault-crossing.

5. The slight flow, or seepage of surface water, continuously following the ore-bodies from the surface down to the depth limit of shipping grade, and then ceasing almost entirely.

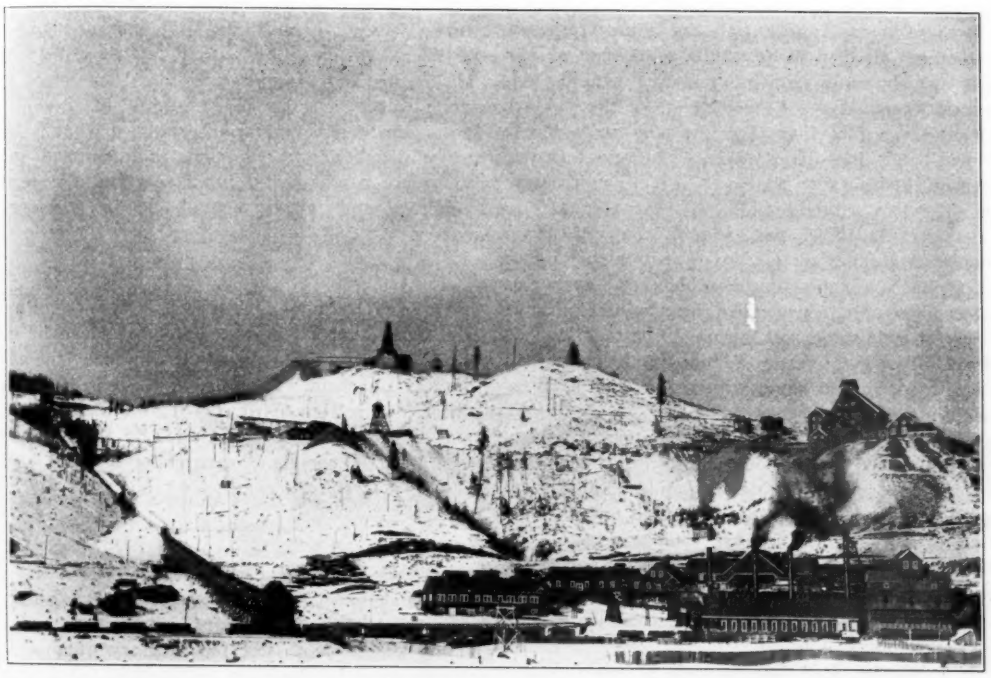
Conclusion.—In regard to secondary enrichments, the following general conclusions have been reached by the writer after a study of the behavior of ore deposits in a large number of mines in the Rocky Mountain region.

1. That the secondary enrichments in the mines at Rossland was effected by methods which are common to many mines in other regions.

2. That in the large majority of cases, secondary enrichment has been produced by the slow downward percolation or gravity flowage of surface waters through areas in veins crushed or reopened by dikes or fault-crossings or compressive strains subsequent to primary mineralization.

3. That such surface waters found avenues of escape, not by circulation in the veins, but by ordinary gravity flowage along their strike or by openings through the enclosing country rock provided by the dikes and fault-crossings.

4. That the depth limit of ore-bodies resulting from secondary enrichment is practically coterminous with the level to which the surface waters extend.



No. 1. War Eagle. Josie. Le Roi.

SOME ROSSLAND MINES.

COAL IN RHODESIA.—The British Admiralty has asked to be furnished as soon as possible with a sufficient tonnage of coal from Wankie in Rhodesia to enable it to be tested by ships on the Cape stations. The Cape Government railways are anxious to take 20,000 tons a month as soon as they can obtain it.

ARSENIC MANUFACTURE.—In a recent address before the Southwestern Branch of the British Medical Association, Doctor W. F. Thompson referred to the comparatively slight danger of fatality in the manufacture of white arsenic as carried out in Devon and Cornwall. Although the fatal dose of arsenic is very small, no case of death is known to have been due to an overdose, or from absorption through the skin or by inhalation of the fumes. However, the arsenical dust causes the millers and packers to suffer from certain skin affections, unless great care be taken. Cough and bronchitis are common, and gastric troubles are occasionally found, but nervous disorders are rare.

ANTIDOTE FOR CYANIDE POISONING.

The importance of this subject warrants the publication of an abstract of a paper prepared by Dr. C. J. Martin and Mr. R. A. O'Brien.[1] These gentlemen suggested an antidote, the usefulness of which has been proved since then at a great many cyanide works in the mining regions of Victoria, Australia. The investigations made by the authors arose out of a request by the Department of Mines to advise in the drafting of instructions as to the best course to pursue in the event of an accident.

Rabbits were operated upon; in every case the rabbit was weighed and the fatal dose was determined in grams per unit weight in kilograms of rabbit. A dose of 0.01 gram of potassium cyanide per kilo. of rabbit was decided upon, after numerous tests, as certainly fatal.

Hydrogen peroxide has been recommended to be given subcutaneously in 3 per cent solution and also by the stomach in 2 per cent solution. Eight experiments were made of subcutaneous injection. The result was always the same; the animals all died, and death was not delayed.

Six experiments were made by the alternative method, by the stomach, with the same unfavorable results.

The authors then made experiments to determine the velocity of disappearance of KCN when mixed with H_2O_2 and found that the velocity varies with the temperature, being 5.99 times as rapid at 38° C. as at 14° C.

It was only concluded from these experiments that hydrogen peroxide is of little value in the treatment of cyanide poisoning. Solutions of hydrogen peroxide do oxidize hydrocyanic acid and potassium cyanide, thereby forming comparatively innocuous bodies, but evidently the action does not occur with sufficient rapidity to be of value. The action of hydrogen peroxide (H_2O_2) upon hydrocyanic acid (HCN) is usually represented to form oxamide $C_2O_2N_2H_4$ in which two molecules of hydrocyanic acid react with one molecule of hydrogen peroxide, thus:[2]

$$2HCN + H_2O_2 = C_2O_2N_2H_4.$$

The authors, however, were unable to obtain oxamide[3] by oxidizing KCN with H_2O_2.

The oxidization of hydrocyanic acid proceeds still more slowly than the above, and the presence of a trace of hydrochloric acid was found to further diminish the rate. It was found that the oxidization of hydrocyanic acid, when the solution contained 3.5 molecules of hydrogen peroxide to one molecule of hydrocyanic acid, was not completed in 24 hours at 14° C., i. e., required six times as long as was required under the same circumstances, and at the same temperature, to oxidize cyanide of potassium.

The failure of hydrogen peroxide as an antidote in the experiments was therefore explained by the slowness of the reaction between potassium cyanide and hydrogen peroxide. As will be seen when the experiments with cobalt chloride and ferrous hydrate are described, in no case did they succeed in saving an animal when the interval between the administration of the poison and the antidote exceeded five minutes, so that no antidote, the value of which depends upon a reaction which is not instantaneous, is likely to be of service.

That hydrogen peroxide should be useless when administered by hypodermic injection is not surprising, considering that this substance is rapidly decomposed in presence of the tissues and blood.

Cobalt Chloride.—Experiments show that this chloride is capable of dealing with any balance of unabsorbed cyanide remaining in the stomach. Considerable excess of the quantity absolutely required to combine with the cyanide. given was found necessary. With such excess the potassium cyanide would be rapidly and completely converted into the insoluble cobalt cyanide.

It has, however, a great drawback. Salts of cobalt are themselves poisonous,[4] and in order to ensure rapid conversion of potassium cyanide into cobalt cyanide, a considerable excess of cobalt chloride must be taken, so that the balance of cobalt chloride may be enough to produce dangerous, or even fatal, symptoms on its own account.

Ferrous Hydrate.—This, when added to a solution of cyanide, forms a ferrocyanide. The reaction is instantaneous at the body temperature. The ferrocyanides are only slightly poisonous. It would seem, therefore, as if the administration of a solution of sulphate of iron, together with an alkali, should give at least as good results as was obtained with cobalt chloride, and possess, moreover, the great advantage over the latter in that the iron and the alkali are quite innocuous. Eleven experiments were made with varying qualities of ferrous sulphate and sodium hydrate.

In these 11 experiments only one animal survived. The others all died in about the same time as animals which had reecived no treatment. Post-mortem examination of the contents of the stomach disclosed the fact that there was no ferrocyanide formed, and that the cyanide was present in the form of hydrocyanic acid (HCN). The stomach contents were strongly acid.

Ferrous Sulphate and Potash, Together with Powdered Magnesium Oxide.—The total acidity of the stomach contents of the rabbits was such that it was impossible to neutralize them by a solution of potash or soda dilute enough not to be caustic. This difficulty was got over by administering magnesium oxide in suspension along with the ferrous sulphate and dilute potash.

When a quantity of ferrous sulphate and potash, equal to 10 times the amount theoretically necessary to form ferrocyanide with the cyanide administered, together with magnesium oxide enough to neutralize three or four times the expected acidity of the stomach, was given within five minutes of poisoning, they succeeded in saving all the animals.

Brief Summary of Results.—At the present time no physiological antidote to hydrocyanic acid is known, nor is there any remedy available which can follow this powerful poison into the circulation and there neutralize it. One can only endeavor to stop further absorption by converting the unabsorbed balance into some non-poisonous compound. Any chemical reaction to successfully accomplish this end must be such an one as takes place very rapidly. We have shown that hydrogen peroxide fails entirely on this account. This oxidizing agent completely destroys prussic acid in time, but it is essentially a slow reaction.

Cobalt salts are poisonous, otherwise they would be extremely valuable, for their solutions are stable, and the reaction, which disposes of the hydrocyanic acid, is instantaneous, and takes place in the presence of amounts of hydrochloric acid, such as occur in the gastric contents.

Ferrous salts, administered with sufficient alkali, are as efficacious as cobalt salts. At the body temperature the formation of ferrocyanides is instantaneous, but they possess two disadvantages: (1) The difficulty in keeping them in solution; (2) the absolute necessity of administering enough alkali at the same time to completely neutralize any stomach contents. This can best be effected by the simultaneous administration of magnesium oxide. The displacement of ferrous salts by other remedies of recent years is no doubt due to inadequate appreciation of this fact.

The extreme rapidity with which cyanides poison (the authors never succeeded in saving a rabbit unless treated within five minutes of the administration of a certain fatal dose of KCN) leaves no time to prepare solutions and collect remedies. They therefore think that in all mines and mining laboratories where opportunities for accidental poisoning by cyanides occur, solutions of ferrous sulphate, weak potash, and a small packet of magnesium oxide, together with a stomach tube and suitable receptacle for mixing, should be kept ready prepared in some suitable position so that they could be administered with only a few seconds' delay.

The total acidity of the stomach contents in man would be unlikely ever to exceed that of 500 c. c. of decinormal hydrochloric acid (.36 per cent HCl). This would be met by 1 gram of magnesium oxide. It is recommended that the following be prepared:

(1) 30 c. c. (1 oz.) of 23 per cent solution of ferrous sulphate.

(2) 30 c. c. (1 oz.) of 5 per cent solution of caustic potash.

(3) 2 grams (30 grains) of powdered magnesium oxide.

(4) A metal receptacle of 1 pint capacity.

(5) A stomach tube.

Nos. 1 and 2 should be in hermetically-sealed tubes, which can be broken into the receptacle and powdered magnesia and half a pint of water added, shaken up, and administered. This amount of antidote would account for 5 grams of cyanide of potassium, a quantity far in excess of what is likely to be drunk accidentally, but, as mentioned above, to secure a sufficiently rapid reaction, the ferrous sulphate and alkali should be in considerable excess.

PURIFICATION OF HYDROGEN.—C. Renard has found that arseniuretted hydrogen can be completely removed from the gas produced by the action of acid on chemical spelter, if the gas be bubbled through petroleum spirit cooled to a temperature of 110° C. by means of liquid air. By this means the separation is complete, even from a rapid stream of gas.—(*Comptes Rendus*, 1903, pp. 1317-1318.)

BRASS IN THE ELECTRIC FURNACE.—An interesting experiment is described by M. Ch. Féry in a recent issue of *Le Génie Civil*. The experiment, which was made to test the accuracy of an optical pyrometer of his devising, consisted in the fractional distillation of brass in the electric furnace. This furnace took 600 amperes at 80 volts, and with it 11 lbs. of copper could be boiled off in six minutes. On charging it with brass containing 37 per cent. of zinc, the temperature rose in half a minute to the boiling point of zinc, which was found to be about 1,100° C. This temperature remained nearly constant for one minute, which sufficed to get rid of all the zinc, and in two minutes more the boiling point of copper was reached, which was found to be 2,100° C. The copper left in the furnace at the end of the experiment contained barely a trace of zinc, and was very nearly pure, though a little carbon was mixed up with it in the form of graphite. The pyrometer used in these experiments is of a very interesting type. It has the advantage that no portion of it is exposed to a really high temperature, its indications being dependent on the fact that the total radiation emitted by a "theoretically black" body varies as the fourth power of the absolute temperature. The interior of any furnace into which there is but a small opening acts as a theoretically black body. M. Féry's method of measuring the temperature therefore is to receive the radiation, from a small opening into such a furnace, on a thermopile, so shielded that the amount of radiation received is independent, within limits, of the distance of the couple from the opening. This thermopile is connected up to a d'Arsonval galvanometer, and the temperature is estimated from the observed deflection in the usual way. In cases in which it is impossible to have an opening direct into the furnace, M. Féry builds a small muffle into the wall of the furnace, and obtains his temperature readings by pointing his instrument at the interior of this muffle.

[1] Contributed by them to the *Proceedings* of the Society of Chemical Industry of Victoria. Vol. I, pp. 119-129; Melbourne, 1902.

[2] Attfield, "Journal of Chemical Society," 1863.

[3] Professor Orme Masson, president of the society, stated at the meeting that the interaction of pure KCN and H_2O_2 formed potassium cyanate and potassium ammonium carbonate.

[4] Stuart, "Archiv. f. Experimental Pharmacologie," Vol. XVIII, 1884.

CORNISH PROSPECTING.

BY AN OCCASIONAL CORRESPONDENT.

Prospecting is being carried on with greater vigor in Cornwall and Devon to-day than for any period during the past thirty years. There is no "boom," no newspaper talk, no attempts made to resuscitate old mines by any talk of their being fabulously rich, because they are "knackt" (abandoned); it is genuine exploration by individuals and small syndicates, who are using their own money and labor.

Near Okehampton a small copper mine is being developed, and an effort was made eighteen months ago to get speculators to work the old Okehampton copper mine. The Devon United Mines Syndicate near Mary Tavy, about 4 miles from Tavistock, is now at work. On this mine there are two sets of Cornish stamps, one 16 and one 12 heads, the axle, on which the cams are fixed, making eight revolutions a minute. The tin ore is raised above the 70-ft. adit, the shaft being sunk below the adit for the next level. The formation is slate, locally known as "killas." In such formations the tin and copper ore are usually the best, but the deposits do not always improve with depth. There are three Wilfley tables at work, but the extraction is not good, as both sand and slimes are treated on the same table. The tailings carry 13 lb. of tin to the ton (2,240 lb.). This mine is worked entirely by water-power, the stamps are driven by a water-wheel 80 ft. high, and the Cornish pump used for sinking by a similar wheel. An important discovery has recently been made, a vein 3 ft. wide of mispickel and copper pyrite having been opened for 30 ft. in length. Although this discovery is close to the surface, it is not being worked, owing to the low price of arsenic. Development is being concentrated on the tin lode. This mine is in a well-known mining district.

At Kit-Hill a prospect is fast being developed into a mine, 12 heads of Cornish stamps are at work driven by waterpower; the Quarry lode has shown good values for 300 ft., and a tunnel has been started to intersect the vein 120 ft. deeper.

The Prince of Wales is a mine which has worked almost uninterruptedly for over 40 years, first for copper, then a little silver and now for tin. The surface works have recently been closed and the French company which owns this property turned its attention to development.

Hingston Downs adjoins Kit-Hill. This hill is immortalized in poetry, thus:

"Hingston Downs well yrought
Is worth London town dear ybought."

But the couplet has not yet proved true. A German company is now preparing to work the old mine, the shaft has been retimbered, and it is the impression, as well as the hope, of the old miners that the mine will prove valuable.

Gunnislake Clitters and its system of magnetic separation will be written of later, as it has been the means of turning a losing property into a paying concern. June showed a profit of $4,730.

The past two years in this district has seen the abandonment of Devon Great Consols, after working 60 years. This mine was divided into 1,024 shares, and the shares at one time reached $3,500 each, and during the first 12 years of work paid $3,000 a share in dividends. For many years this property was the largest producer of arsenic in the world. The Duke of Bedford gave employment to 200 of the men last year, when the mine closed down. The Gawton mine on the banks of the Tamar has ceased work this year; it was also worked for arsenic. The same remark applies to the Trelawney arsenic mine, situated between Callington and Liskeard. The Wheal Friendship mine, at Mary Tavy, also suspended operations about 18 months ago on account of the low price, or rather non-sale, of the arsenic. It was here where the first Cornish rolls were successfully worked nearly 100 years ago. This mine paid $11,500 in dividends per share on 128 shares. A Glasgow company worked the leases for ten years. It is also noted for its water-power and water-wheels. I was told that a 1,300-ft. head of water could be utilized from the Dartmoor hills. The Drakewalls mine, at Gunnislake, worked by John Taylor & Sons for a little over two years, has not proved a success; the water has been pumped from the bottom, but the valuable lode of tin said to exist has not been found. Only a few men are employed.

Gunnislake granite quarry is now being vigorously worked by Pearson & Son, contractors to the Admiralty. The pay-roll amounts to $2,000 per week. Machinery was introduced to dress the granite blocks, but was too expensive, the cost being more than double hand labor, which costs 20c. per foot. This is the only quarry in the West worked on modern principles, having steam cranes, locomotives of the standard size, and worked by two galleries. No large blocks of granite are quarried.

In St. Austell district prospecting has been carried on at the Commerce mine, but not on modern principles, and has not met with the success it otherwise would. At Polmear mine experiments have been conducted by Mr. Abelspies to treat the complex ores, and now after an expenditure of $20,000 in experiments, he has decided to erect a plant to treat such ores, which are said to be abundant. A prospect is also being worked at Trenerom Hill, St. Ives district, and in the driving of a small tunnel some rich ore was taken out and sent to the smelter without being crushed. In the St. Agnes district Messrs. Bainbridge, Seymour & Co. are at work on the Tywarnhaile mine, and have a force of men at the adit level stoping a grade of copper ore varying from 1 to 2 per cent. The Elmore process is making a concentrate from 10 to 12 copper. Two Wilfley tables are also used to remove the iron pyrite before the pulp is treated by oil. The machinery consists of 10 stamps—California pattern—and an electric hoist, the only one of the kind in Cornwall. This is a private company.

Adjoining Tywarnhaile a small 4-head Cornish stamp-mill is at work, treating the dumps for tin. Formerly the same dumps were stamped for arsenic, and the same system is used for treatment, namely, "strips."

In the Marazion district considerable prospecting is being carried on, notably at Gurly, where a portable engine is at work, Wheal Hampton, Wheal Kidney and Wheal Jane; at the last named for chalybite, and the crystals of same are splendid. This district has suffered through the collapse of the Tregurtha Downs mine, where four years ago futile attempt was made to re-work an abandoned mine with the usual result.

In the St. Just district there is only one mine at work, the famed Levant, which still continues to pay dividends. The dumps of the old mines are being stamped, and are sorted in some cases most successfully.

In prospecting through Cornwall and Devon the money is not being expended at surface in buildings, etc., but in searching for and proving the veins.

RELATIVE VALUE OF ZINC WHITE AND WHITE LEAD.—J. L. Breton reports the results of further investigations as to the relative value of zinc white and white lead as pigments (*Comptes Rendus*, 1903, pp. 1446-7). His conclusions are largely in favor of zinc white, not only for sanitary considerations, but also because of its greater covering power and other advantages. Both zinc oxide and lithophone adhere more firmly and display less tendency to blister than is the case with white lead paints, while the mixture of zinc oxide with linseed oil is more homogeneous than the mixture with white lead. For equal weights the covering power of white lead, lithophone and zinc oxide are approximately as 3:4:6. The zinc pigments are superior in resistance to heat, sudden variations of temperature and oxidizing agents, while they have the further advantage of not being affected by hydrogen sulphide. The question of the relative covering power of lead and zinc pigments has been recently discussed in our columns.

NOTES ON RECENT WORK ON THE MESABI IRON RANGE.

BY DWIGHT E. WOODBRIDGE.

There have been no great changes recently in conditions as to drill exploration on the Minnesota iron ranges, but contractors notice a lessened demand for drills for future operations, and a lesser desire for options on machines; there is not the inquiry for drills for later exploration that there has been for the past two years.

There must be for many years a considerable amount of exploration on the Mesabi Range, not necessarily in new ground, for there is no new ground there now, but in deepening, extending and connecting the data afforded by previous explorations. In prior years, especially during the early period of work in this range, it has been the custom to explore to no great depth when the holes went into rock. It was even the custom for drill contracts to be drawn with a proviso that the ferruginous chert, the ore-bearing formation, should not be drilled more than a few inches. Of late years this has been gradually changing, and in the past twelve months or so excellent ore is found in or under chert up to a thickness of 100 to 150 ft.; and there is no reason why, if the character of the rock is such as to have permitted the concentration of ore below or within it at still greater depth, explorations should not continue successfully to such depth. It is a fact that drill-holes sunk in rock to a greater depth than 150 ft. have not cut merchantable ore-bodies; but this may be explained from the fact that the number of these deeper holes has been very small, and that they have easily missed ore. There is a very large area on the Mesabi, where drills have stopped on ledge, or slightly in it, that will be re-drilled. This work is, in fact, well under way, and will be continued for a long time.

Then again, four or five holes on a 40-acre tract is not enough to test a piece of land thoroughly, and the distance between holes may conceal a very nice ore-body. In other words, drilling will be at smaller intervals than formerly, and many large exploring agencies, including the United States Steel Corporation, are not content with previous results or old records.

Notwithstanding the issue of maps defining the boundaries of the ore-bearing formations, it is well known that new work is constantly making necessary changes in these boundaries. This is well known, and is no unfriendly comment on the work of the map-makers, for none of them, from the United States Geological Survey down, have had the benefit of anything more than the results of the actual researches of others. There has been no possibility of original work on the part of the map-makers, for they had no appropriations for drilling, nor was there at any place upon the entire Mesabi Range the slightest approach to an outcropping of the upper rocks, the Virginia slates. The determination of the point of contact of these rocks and the iron-bearing formation has been, in every case, therefore, from drill holes, and these have been at intervals of varying extent. It is probable that the south line of the formation will be modified with every map issued, and there is field for exploration along this line for some time.

In the history of the iron trade there has not been a single district where explorations have been as extensive, and, one may say, as voluminous, as on the Mesabi in the past two or three years. There has, also, never been a mining region where results have been as gratifying as there; but these conditions are changing. New work is not showing the results that were common a few years ago. The work of the present years is not giving many ore-bodies, and most of what are found are of a size or character that would not have been considered favorable a few years ago. The Mesabi cannot be likened to a sucked orange; but work there, to be fruitful, requires to-day a considerably greater knowledge, not so general and theoretic as local and special, than it did a few years ago.

There is still a good demand for explored ore-bodies, such as may be found, and there is less inclination to cavil at grades and quantities than there was a few years ago. Blue-prints of explorations that are to-day called mines would, a few years ago, have been thrown into the waste basket, or preserved merely as curiosities.

In some recent deep explorations on the Vermillion Range the cost of stones per foot of drilling averaged $3.50. This work was done with a positive screw-feed machine, a class that is not extensively used in that region at this time. The rock drilled was almost entirely jasper.

In one recent exploration on the Mesabi Range, in the center of T. 58, R. 19, a drill-hole was sunk nearly 500 ft. in taconite without favorable result. In work in the center of T. 57, R. 21, a drill found ore under 150 ft. of the same rock. In work near Biwabik, the ore-bearing formation is being materially widened by new holes to the south of work previously done.

A mine of about 1,000,000 tons of high-grade ore has been found in T. 58, R. 16, on an 80-acre tract, where not less than $50,000 had been spent in fruitless exploration. Part of this former work had been done by a mining engineer, but in such a way that the ore was avoided; the larger part of the money had been spent a number of years ago by tyros, who did everything but find ore. Their shafts, one of which was more than 100 ft. deep, is now found to have been within a few feet of a part of the ore-body. This ore-deposit is in a narrow and tortuous trough, but the general course of this trough should have been plain to any man having experience on the Mesabi Range; but this experience was lacking when these shafts were sunk. This ore lies under only 35 ft. of surface, and is of a very high grade, both chemically and physically. It is facts like this, and others of the same nature, though perhaps not so emphatic, that led to the remark above, that future work on the Mesabi must be more concentrated, and that a thorough local and specific knowledge is requisite, not necessarily to success, because that may not come with the greatest knowledge, but to any reasonable anticipation of favorable outcome.

NOTES ON THE SUDBURY DISTRICT, ONTARIO.

By Our Special Correspondent.

The first annual report of the International Nickel Company, lately issued, ought to be rather encouraging even in these liquidating times for capitalists to go into nickel mining in the Sudbury district. Though all operations at the company's mines were partly curtailed, and only a few of the smelters had been kept running throughout the year, the earnings of the constituent companies, according to the report, amounted to $1,119,417, and after the payment of $110,024 for general expenses, and $450,244 as interest on bonded debt, the remaining surplus was $559,149. At present this company is not mining any ore, but three of the smelters are being run on ore taken out during the earlier part of the season. The old smelting plant, first erected, having been worn out, has been torn down, and the foundation is being prepared for a new plant of four large reverberatory furnaces, each of 400 tons capacity, to treat the ore in a somewhat different way. But even with such a plant and unlimited supply of ore, the company will have to make things hum in order to pay a dividend on its excessive capitalization of $36,000,000 in stocks and bonds.

All the new processes that have so far been tested for the treatment of the Sudbury ores have failed, but a process worked out and patented by D. P. Shuler, formerly head chemist for the Canadian Copper Company, gives promise of more successful results, as would naturally be expected from the intimate knowledge of these ores possessed by the inventor in this case. There is from 40 to 50 per cent of iron in all the Sudbury nickel ores. It is good iron, too, without any phosphorus, and the sulphur can be completely expelled by using the furnace designed by G. A. Richard, of the Mount Morgan mine. In the present wasteful process all this iron is slagged off and thrown away, but Mr. Shuler claims that by his process most of the iron is saved in making nickel steel, and also that very much less of the nickel content of the ore is lost. At all events this process is apparently well worth testing on a practical scale, which, however, the inventor is not in a position to do.

The people of the Sudbury district have not been in the least surprised at the financial troubles of the Lake Superior Power Company, of Sault Ste. Marie. But it is to be hoped that the new management will be able to pull through in some way. After an expenditure of nearly $28,000,000 under the old management, and seven years of time, not a single one of the company's varied enterprises has been put on a paying basis. The authorized capital stock of this unfortunate company is no less than the enormous aggregate of $117,000,000. Well informed men have no hesitation in saying that all the available resources of Northern Ontario, from the Ottawa River to the Lake of the Woods, leaving out the pine timber, which is reserved by the Government, would not suffice to pay a fair dividend on this vast amount. Mr. F. H. Clergue, the enterprising promoter of the whole concern, used to boast that he had secured the largest mill pond in America for his works, namely, Lake Superior, but others say that he had still more water in the stock of the company.

In a recent and very interesting article on nickel steel in the *Scientific American*, the statement is made "that the only thing that stands in the way of its general use is its cost, due to the scarcity of nickel, the world's annual production of which is only about 7,000 tons." The first part of the statement as to the cost of nickel, from 40c. to 60c. a pound, is quite true. But these high prices are not due to the scarcity of nickel at all, but to a mutual compact of long standing between Le Societé Nickel, the French company working the New Caledonia mines, and the American producers and refiners of nickel. Dr. Ed. D. Peters, who built the first smelter for the Canadian Copper Company, and who knows a thing or two, declared before an investigating committee of the Dominion Parliament, thirteen years ago, that nickel could be profitably extracted from the Sudbury ores at 25c. a pound, and the mines were only being worked on a very small scale then. But now over 1,000 tons a day could be raised from the Creighton mine alone, and the Victoria mine belonging to the Mond Nickel Company comes next to it. Then, besides these and other developed mines, there are over twenty good workable ore bodies in the district still lying idle. The whole cry of the nickel producing companies in the past has been the want of a larger market for the metal, and from the above facts as to the number of mines yet unworked, it will be seen that there is not likely to be any "scarcity" of nickel for a long time to come.

Work on the new Grand Trunk Pacific Railway will be started as soon as the politicians at Ottawa get through talking and scheming about it. Surveying parties have already been sent out with a year's supplies to find the most feasible route from Quebec city to the Pacific coast. The line will probably run from 75 to 100 miles to the north of Sudbury, and may open out or traverse some new mineral belts. Only for the building of the Canadian Pacific the nickel mines of Northern Ontario would likely never have been discovered yet. The track of the main line of the road happened to cross the outcrop ridge of the Murray mine, three miles west of Sudbury, and the rockmen threw the ore on the road bed. One of them burnt some of it in his stove to test it for gold, but the sulphur fumes drove him out of the cabin and he tried it no more.

MINING CONCESSIONS IN SPAIN.—According to official statistics, the surface dues paid on mining concessions in Spain during 1902 amounted to 3,878,699 pesetas, while the tax, or royalty, paid to the Government for working, amounted to 4,066,029 pesetas. The largest number of concessions in force are for mining iron ore, while those for lead come next in number. Other concessions in force are for mining antimony, quicksilver, copper, gold, zinc, tin, manganese ores, coal, phosphate of lime, salt, sulphur, graphite and alkaline salts.

IRON AND STEEL EXPORTS AND IMPORTS.

Exports of iron and steel—including machinery—from the United States in June are valued by the Bureau of Statistics of the Treasury Department at $8,472,942, which is $700,951 more than in June, 1903. For the six months ending June 30, the total value of these exports was $48,076,288, against $49,301,392 in the first half of 1902; showing a decrease of $1,225,104, or 2.5 per cent. The more important items of these exports were as follows, in long tons:

	1902.	1903.	Changes.
Pig iron	36,746	7,457	D. 29,289
Billets and ingots	934	651	D. 283
Bars	21,507	20,243	D. 1,264
Sheets and plates	9,683	8,428	D. 1,255
Rails	48,665	3,769	D. 44,896
Structural steel	36,867	15,960	D. 20,907
Wire	51,888	54,128	I. 2,240
Nails	46,281	48,110	I. 1,829

The only increases shown were in lines where there is a long established trade. It must be remembered that in 1902 exports had fallen off very largely from those of the preceding year.

Exports of iron ore for the six months were 5,226 tons, against 16,451 tons in 1902; a decrease of 11,225 tons.

The total value of iron and steel imports in June was $4,604,777, an increase of $968,847 over June, 1902. For the half-year the total value was $25,321,418, against $15,171,163 in the first half of 1902, an increase of $10,150,255, or 66.9 per cent. The chief items of these imports were, in long tons:

	1902.	1903.	Changes.
Pig iron	115,603	452,451	I. 336,848
Scrap iron and steel	35,646	62,337	I. 26,691
Ingots, billets & blooms	86,394	176,215	I. 89,821
Tinplates	35,526	25,482	D. 10,044

The reason for the large increase in imports this year is found in the heavy consumption of iron and steel here. British and German pig iron and steel billets have found quite an extensive market along the Atlantic Coast. While the quantities taken are comparatively large, they are, however, insignificant when compared with our total production.

Imports of iron ore for the six months were 464,765 tons, against 577,071 tons in 1902, showing a decrease of 112,306 tons, or 19.5 per cent, this year.

PRODUCTION OF FERROMANGANESE BY ELECTRIC SMELTING.—G. Gin proposes (French Patent 326,438, November 18, 1902) to produce ferromanganese by smelting siliceous ore, mixed with sufficient lime to combine with the silica as bisilicate and sufficient carbon to reduce the protoxide of manganese, in an electric furnace, the slags being subsequently treated in a second furnace for the production of silicide and carbide of calcium.

A NEW METHOD OF ALUMINUM SMELTING.—G. Gin, of Paris, produces aluminum by decomposing an electrolyte composed of a molten mixture of aluminum fluoride and sodium sulphide, in the proportion of one molecule of the former to three molecules of the latter. The aluminum fluoride is produced by treating bauxite with a solution of fluorhydric acid, the impurities, such as titanic acid and iron, which are taken into solution, being precipitated by means of alumina. The decomposition of the electrolyte gives a residue of sodium fluoride, from which the fluorhydric acid required for preparation of the aluminum fluoride is obtained by treatment with sulphuric acid. Sodium sulphate is thereby obtained as a by-product, from which the sodium sulphide required in the process can be produced.—(British Patent 964, January 14, 1903.)

ABSTRACTS OF OFFICIAL REPORTS.

Société des Mines et Fonderies de Zinc de la Vieille Montagne.

The report of this important company, which has its headquarters in Belgium and is probably the largest manufacturer of zinc in the world, shows that during 1902 the profits on sales of ores, spelter, in various forms, and zinc-white amounted to 5,661,548 fr.; miscellaneous receipts were 74,470 fr., making a total of 5,736,018 fr. General expenses, taxes and interest absorbed 1,210,686 fr., leaving a balance of 4,525,332 fr., to which is to be added a balance of 16,658 fr. carried over from previous year, making a total of 4,541,990 fr. From this the sum of 815,066 fr. was set aside as the reserve required by law, and the further sum of 3,659,417 fr. was paid out in dividends, leaving a balance of 67,507 fr. forward to the current year.

The report says: "In 1902 the average price of spelter was 461 fr. per ton, against 424 fr. in 1901, showing an increase of 37 fr. The company's works produced 70,872 tons of spelter, while the rolling mill turned out 62,945 tons of zinc sheets. In addition to this the works produced 8,642 tons of zinc white.

"The year was one of fewer fluctuations than the previous period. The production of zinc in Europe showed an increase of about 12,000 tons over 1901, but the consumption appeared to be larger, and the price of the metal was much better. The improved situation was not due in any sense to speculation, but the increasing demand for zinc for various purposes. At the same time, no metal from the United States was offered in European markets, and it appears that the United States consumed its entire production.

"The price of coal remained very high, although the market was somewhat quieter. The company's expenses for fuel in 1902 were greater than for the average of the years 1896-98 by about 1,500,000 fr. Labor was more abundant, and there was very little change in wages. The company is now feeling the benefit of the improved organization of its working force, and of the measures taken to improve their condition, making the employees more content and less inclined to change. The price of ores purchased remained very high. The production does not seem to have increased in accordance with the demand.

"The manufacture of sulphuric acid in the company's works, at Baelen-Wezel, was further developed and extended. The total output of acid for the year was 48,840 metric tons. This department worked in a very satisfactory way, and furnishes a new source of profit to the company."

Chillagoe Railway and Mines, Limited.

This reorganized company owns the Chillagoe copper mines in Queensland, with the railroad by which the mines are reached. The directors' report for 1902 says: "Mining operations, completely suspended by the old company in December, 1901, were resumed under the control and at the cost of the new company in April, 1902. Mr. T. J. Greenway, well known in Australia for many years in connection with Broken Hill as a competent mineralogist and metallurgist, received appointment as general manager to the company, and assumed control in August. Up to the present he has confined his work to the Queenslander, McIlwraith, Penzance, Zillmanton, Harper, Boomerang and Hobson mines. At these mines the work completed to December 31 included, amongst other operations, the placing of a good deal of mining equipment and 2,214 ft. of sinking and driving.

"Resulting developments of most importance were in the Penzance and Zillmanton lodes, where, in the former at a depth of 150 ft. and in the latter at 250 ft., copper ore of profitable grade was exposed. The full extent of the ore is not yet known, although at Penzance, where it has been possible to proceed with more expedition than at Zillmanton, a nice shoot of ore of considerable length and width, and worth from 5 to 8 per cent. of copper, is proved. It is said to show a very healthy appearance underfoot. The latest reports intimate that driving in both lodes at the levels named is still going on, in ore of good quality.

"In the opinion of the directors the discovery of payable ore at these depths is important, as affording healthy encouragement to further development at deeper levels. Mr. Greenway is also of this opinion, and he has already indicated some important work in accordance with it. Work at the other mines named, except at the Harper (where a prospecting shaft was pushed down until water became too heavy for available pumping appliances), has been chiefly directed towards obtaining suitable and sufficient ore for the furnace. Judging by the reports this has been accomplished without serious difficulty."

The manager's report says: "The smelting plant consists of 5 copper and 1 lead smelting furnaces, each of which has a smelting capacity of from 1,000 to 1,500 tons of ore weekly.

"The smelters are served by a well-arranged blowing plant, driven by steam power, and by an electrically-driven pumping plant, which, however, can scarcely be considered satisfactory, its pumping capacity not being large enough. A dam, capable of impounding 1,500,000 gals. of water, has been constructed across the Chillagoe Creek, and the same was completed in September last. At the time of the completion of the dam, which was at the end of an unprecedented drought, the creek was running at the rate of 4,000 gals. per hour. It may, therefore, be taken for granted that we have an assured water supply, sufficient to meet all requirements of the smelting works.

"We started copper smelting operations, with one furnace, on October 23, and the same were continued until the furnace was shut down on December 24 for the Christmas holidays. The ore smelted was: Mungana, 3,085 tons; Mount Garnet, 284; other purchased ore, 34; Chillagoe exidized, 2,848; Chillagoe sulphide ore, 2,140; total, 8,391 tons. The product was 699 tons matte, containing 392 tons copper and 24,564 oz. silver. The cost of smelting was 17s. 10d. per ton of crude ore dealt with, and the copper recovery was 87.55 per cent. I expect that we shall very shortly bring down the smelting cost to about 15s. per ton.

"We are now getting the silver-lead furnace ready for operation. We have accumulated on the smelter floors about 2,000 tons of ore, most of which is purchased material, ready for smelting."

Daly-Judge Mining Company, Utah.

The report of President John J. Daly, after speaking in detail of the organization and early operations of the company and its later purchase of the Anchor mine, says: "As soon as possession of the property was secured an examination of the mine was made, and I can say that the officers of the company were all agreeably surprised to find in the many miles of underground workings such a large amount of ore opened up, estimated at the time by the Anchor people at 72,000 tons. On the other hand the property was found to be in a bad condition for the future economical handling of the ores. It was seen at once that it would be necessary to enlarge and timber many drifts, straighten and relay car tracks, widen the main shaft from four to five feet, lay new ties in the 7,000 ft. of tunnel, cut down grades in places and make them conform in others with the main avenues through which mining must be done. On the surface it was found necessary to build new boarding and sleeping houses for the accommodation of the employees, enlarge the blacksmith and machine shops, superintendent's house and office; enstall an electric lighting plant, build new coal chutes, barns for the tunnel horses and a complete changing of the concentrating mill. This work was all mapped out, and its execution began without unnecessary delay. It is now practically all completed, and in addition a large amount of development work has been performed in the mine during the same time.

"The work of reconstructing and enlarging the concentrating mill from a capacity of 100 to 300 tons per day, was begun as soon as practicable after the transfer, considerable time being consumed in conducting a series of tests and experiments, looking to a more economical handling of the ores, closer saving of values, etc. It was late in August before these experiments were satisfactorily concluded. Contracts for machinery were then awarded to different responsible firms, who agreed to make delivery between the 1st and 15th of November. Owing to the rush of work at the Eastern manufactories the last of the equipment did not arrive until late. Without going into details I will say that when finished we will have one of the most complete milling plants in the West, well arranged for economical operation, and in which we should be able to save practically all of the values contained in the ores. It must be remembered, however, that a severe winter is upon us, and construction work is necessarily slower than it would be in moderate weather.

"In the handling of from 80 to 100 tons of crude ore in the old mill, the Anchor Company made something like 20 tons of marketable lead-silver concentrates per day and saved for future treatment a product in about the same amount, known as zinc middlings. This product carries from 20 to 30 per cent. zinc, together with some silver, lead and gold. On this product, nearly 20,000 tons of which is piled up at our mill, the Park City Magnetic Zinc Separating Company (which has just placed in commission a new plant capable of handling from 50 to 75 tons per day) has a lease, as well as on any more of the same product that may be made in our mill, up to Oct. 17 next. The revenue from this source, it is confidently believed, will cover all the milling cost on Daly-Judge ores and leave a good balance to be applied to the cost of mining and development. In other words, what has always been considered a detriment in the milling grade of ores in this property, is now and will continue to be a most important source of revenue to the company. In the equipment of our new mill we have arranged for the installation of a complete plant for the conversion of these zinc middlings into a commercial product fully as valuable as the lead, and upon the expiration of the lease given the Park City Zinc Company, next fall, we shall begin treating them at our own plant.

"As a result of the great amount of repair work and improvements that had to be made underground, prospecting has not been pushed as rapidly as it otherwise would have been, but this period of getting ready is now at an end, and from now on new territory will be explored in a vigorous manner. The several hundred feet of new exploration work performed has developed some fine and extensive ore bodies, and indications would lead us to expect that as the levels are run west in new, or virgin, territory, ore in sufficient quantities will be encountered to supply the mill for many years. Little cross-cutting or exploration work has been done as yet in these new ore bodies; it is therefore difficult to form a correct estimate of their size at this time, but it is safe to say that a conservative estimate would place the amount at fully 120,000 tons. During the year 1901, the Anchor Company, notwithstanding its poor facilities and being able to treat less than 100 tons of ore per day, earned a handsome profit that went to cut down its previous indebtedness. With the changes that have been made in the mine and mill by the Daly-Judge Company, I am sure that the cost of production and reduction of the ore will be lowered not less than 25 per cent. as compared with the Anchor cost, and, with the revenues from the zinc contents or the ore added, coupled with the increased tonnage handled, we feel that we may safely promise substantial results.

"The total production of the Daly-Judge property to December 31, 1902, including the output of the Anchor mine, is 94,639 tons of dry concentrates, sold for $2,417,368, an average return of $25.54 per ton. Any first class ore produced is included with the concentrates. These are the net proceeds received from

the smelters for all ore shipped, after deducting the charge for freight and treatment.

"Complete assay returns of the lower grade, or mill ore extracted from the mine (before concentration) for the years 1901-1902, give an average of lead, 10.29 per cent.; zinc, 16.00 per cent.; silver, 9.85 oz. and gold, 0.016 oz. per ton. The value of the concentrates produced during this period is substantially the same as that for the year ending October 1, 1901, namely, lead 41.00 per cent.; zinc, 8.87 per cent.; silver, 25.67 oz., and gold, 0.043 oz.

"The mine is well equipped in every way, and is most advantageously opened by the Anchor drain-tunnel, nearly 1¼ miles in length, connecting the Anchor shaft on the 1,200-ft. level with the mill. This tunnel drains all the ground above the 1,200-ft. level, so that there is not a pump in the mine, and the great expense of pumping water is avoided. During November and December, 1902, the flow through the tunnel was estimated at 300 to 450 gals. of water per minute, a supply greater than required for the mill. The tunnel affords an outlet for the ore, and transportation at all times for the supplies needed for the mine, independent of the conditions of surface roads."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

The Art of Pattern-making. By I. McKim Chace. New York: John Wiley & Sons. London: Chapman & Hall, Limited. Pages 260; illustrated. Price, $2.50.

Arizona Mining Directory, Yarapai County. Compiled by Russell H. Millward. Prescott, Arizona: the Arizona Mining Directory. Pages, 60; illustrated. Price, $2.50.

United States Commission of Fish and Fisheries. Rotatoria of the United States. By H. G. Jennings. Washington: Government Printing Office. Pages 80, with plates.

List of Beacons, Buoys and Day-marks in the Third Lighthouse District. Compiled in the office of the Lighthouse Board. Washington: Government Printing Office. Pages, 112.

United States Geological Survey, Twenty-third Annual Report of the Director, 1902. Charles D. Walcott, Director. Washington: Government Printing Office. Pages, 220; illustrated.

University of Texas Mineral Survey. Bulletin No. 6. The Mining Laws of Texas and Table of Magnetic Declinations. Prepared by the Survey, Austin, Texas; published by the University. Pages, 40.

Map of the San Juan Triangle, Colorado—Ouray, Telluride, Silverton. Compiled by George S. Clason. Denver, Colo.: George S. Clason. Folding map, 28x34 ins., with Index. Price, $2. Wall Map, 5x6 ft., mounted. Price, $25.

United States Geological Survey. Chemical Analyses of Igneous Rocks. Published from 1884 *to* 1900. *With a Critical Discussion of the Character and Use of Analyses.* By Henry Stephens Washington. Washington: Government Printing Office. Pages, 476.

United States Geological Survey. Professional Papers. No. 1, Preliminary Report on the Kitchikan District, Alaska. Pages, 120; illustrated. *No. 2, Reconnoissance of the Northwestern Portion of Seward Peninsula, Alaska.* By Arthur J. Collier. Pages, 70; with maps and illustrations. *No. 3, The Geology and Petrography of Crater Lake Park.* By J. S. Diller and H. B. Patton. Pages, 168; illustrated. *No. 4, The Forests of Oregon.* By Henry Gannett. Pages, 36; with maps and illustrations. *No. 5, The Forests of Washington.* By Henry Gannett. Pages, 40; with maps and illustrations. *No. 6, Forest Conditions in the Coast Range, Washington.* By F. G. Plummer. Pages, 42; illustrated. *No. 7, Forest Conditions in the Olympic Forest Reserve, Washington.* By Arthur Dodwell and Theodore F. Rixon. Pages, 110; illustrated. *No. 8, Forest Conditions in the Northern Sierra Nevada, California.* By John B. Leiberg. Pages, 194; illustrated. *No. 9, Forest Conditions in the Cascade Forest Reserve, Oregon.* By H. D. Langille, F. G. Plummer, Arthur Dodwell, T. F. Rixon and John Leiberg. Pages, 298; Illustrated. *No. 10, Reconnoissance from Fort Hamlin to Kotzebue Sound, Alaska.* By Walter C. Mendenhall. Pages, 68; illustrated. Washington: Government Printing Office.

BOOKS REVIEWED.

The Optical Rotating Power of Organic Substances and Its Practical Applications. By Dr. Hans Landolt. Translated from the German by Dr. H. Long. Easton, Pa.; the Chemical Publishing Company. Pages 752; with diagrams and illustrations. Price, $7.50.

By the chemist working along technical lines and by those interested in the theory of organic chemistry, this book will be cordially received. The volume is a translation and revision of a German edition, published in 1898, which is recognized as an authoritative and useful compilation, and has gained a well deserved popularity among chemists who are familiar with German. The American edition not only places the work before a new class of readers, but it includes the results of the most recent investigations, making it thoroughly up to date. Besides a large assemblage of data on the constants of rotation of optically active compounds, there are chapters on methods and apparatus, on the practical applications of optical rotation in the determination of sugars, camphor, cocaine, etc., and discussions of a theoretical nature.

Telephony. Part I.—Location of Central Offices. Part II.—Construction of Underground Conduits. Part III.—Cable Plant. By Arthur V. Abbott, New York; the McGraw Publishing Company. Part I, 170 pages; Part II, 190 pages; Part III, 152 pages; all illustrated. Price, $1.50 each.

These three volumes are part of a series, which will be completed in six parts, and which is intended to deal with the telephone question from a side which has not heretofore been treated in connected form. Telephone literature has discussed theory and described apparatus, and the like. Mr. Abbott has taken up the engineering questions connected with the establishment of telephone plants. His series will constitute a manual dealing with those questions, with special reference to the economic features, which lead to the installation of the best plant for the least money.

Part I deals with the location of the central office. The site chosen will evidently have an important bearing upon the cost of installing the plant. The author shows the rules and principles that should guide the engineer in the installation, in order to secure good service, with the minimum quantity of plant. As the wire plant demands from one-third to two-thirds of the total cost of telephonic installation, the methods of its construction are important in an economic design.

Part II takes up the question of installation of conduits which are universally employed in the larger cities, and are rapidly spreading to even the smaller towns. The various forms of conduit are described, methods of laying indicated, and a specification framed under which construction may be carried on. Lastly, data of the cost of various forms of conduit are given, from which estimates may be compiled.

Part III deals with the construction of underground circuits, and is occupied with the manufacture and installation of modern forms of telephone cables in all their varieties. There is a brief exposition of the principles which telephonic laws obey, in so far as a description of such principles will enable the engineer to select the proper form of cable for a particular installation. Methods of manufacture are taken up to the extent of pointing out the faults and imperfections which are likely to be encountered, and against which the designer must guard. The volume closes with a specification prescribing precautions to be taken in cable manufacture and installation, and a chapter on the costs of cable plant. The three volumes still to be published will treat, respectively, of Open-Wire Lines, Substations, and of Switchboards and the Central Office.

Geological Survey of New Jersey. Report on Paleontology. Volume III. The Paleozoic Fauna. By Stuart Weller, Trenton, N. J.; State Printers. Pages, 472; illustrated.

This volume is one of the admirable series constituting the final report of the Geological Survey of New Jersey. It is the third volume of the report on Paleontology, and is devoted, as the title shows, to the fossils of the Paleozoic formations of the State. It is a complete and carefully studied account of the results, in this direction, of the field work carried out under the direction of the Survey in previous years; chiefly in 1899 and 1900, where special attention was directed to this subject. With regard to the purpose of this section of the reports, we cannot do better than to quote from the preface written by State Geologist Henry B. Kümmel:

"The subject matter of the Paleontology Reports is of a more specialized nature than that of some of the volumes of the Final Report series. . . . . Nevertheless, a knowledge of the fossils contained in the rocks of the State is of no little importance. The age of the formations, their correct stratigraphical position, and the conditions under which they originated, are, in part, to be determined by a study of their fossil contents. Correct inferences as to their economic value and the ready and accurate determination of their occurrence depend largely upon a precise knowledge of these points.

"A striking example of this indirect economic value of paleontological studies was seen in connection with these very investigations. Very early in the work it was found that the earthy limestone, so extensively used in the vicinity of Phillipsburg for the manufacture of portland cement, as well as the pure non-magnetism limestone used with the cement rock to increase the percentage of lime, belonged to the Trenton formation, and was readily recognized by the fossils it contained. It was found to occupy a definite position in respect to the underlying Kittatinny limestone, which was highly magnesian and of no value for portland cement, and the overlying Hudson River slate. This fact being determined, it was a comparatively rapid and easy matter to trace the boundaries of the formation and so determine the location of these beds. It was at once possible to eliminate a large area from the field of investigation, with great saving both of time and money. In fact, the report upon the Portland Cement Rocks could not have been prepared without the expenditure of a much greater sum than was involved, if it had been necessary to examine the whole area of Paleoboic rocks with as much detail as was given to a few comparatively narrow zones.

"But even if the study of these faunas were totally unproductive of any economic results, direct or indirect, nevertheless, their investigation is a legitimate part of the Survey work. It is worthy the honor and name of the State to foster 'science for science's sake,' and to carry on investigations which add something to the sum of human knowledge. When it is remembered that these fossils are the remains of living forms—some of them the highest forms of life of their time—and that from these lowly forms has come, through countless years, the grand culmination of the life of to-day, a new interest is aroused. They cease to be mere bits of stone, curious but meaningless, and become instead the touchstones to the past."

The amount of motion in a moving body is called its *momentum,* and is measured by the mass and velocity together. A mass of 1 lb. moving with a velocity of 1,000 ft. per second has the same momentum as a mass of 1,000 lbs. moving at 1 ft. per second.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DESIGNERS' RIGHTS IN BLUE PRINTS AND DRAWINGS.—In this case, suit was brought to recover blue prints and dies used in the manufacture of steel cars, and said to have come into the possession of the defendant through employes of the plaintiff who secured employment with the Standard Steel Car Company upon its formation. The court decided adversely to the Standard and directed the return of all blue prints and dies belonging to the Pressed Steel Car Company. Among others named in the bill of complaint is John M. Hansen, formerly employed by the Pressed Steel Car Company, as chief engineer, and who was instrumental in the organization of the Standard Steel Car Company and also became its president.

The defendant company has had in its possession a great number of blue prints and drawings, showing cars and car parts, and it has also a large number of blue prints made by different railroad companies from tracings or drawings made by these companies from blue prints furnished them by the Pressed Steel Car Company. The latter prints are termed secondary prints, and are in most particulars reproductions of the plaintiff's prints.

The plaintiff company in its bill alleged that certain of the prints in question had been removed by Hansen, but as to these particular prints, the decision says: "The defendant company never received nor had in its possession and the defendant Hansen did not nor did any of the other defendants at any time have in their possession any die, prints or blue prints showing the essential features of dies used by the plaintiff except that some such drawings were in the possession of the defendant Hansen when he was an officer of the plaintiff company, but no such prints were removed by him or any of the other defendants from the plaintiff's premises. The defendant Culverhouse, as admitted by his answer, ordered and had delivered to him, just prior to his leaving plaintiff's employment, certain blue prints of bills of material of the plaintiff company which remained in his personal possession until they were produced in court and placed in the custody of the prothonotary. These prints were so procured and retained by the said Culverhouse without the knowledge or connivance of any of the other defendants. These prints are the property of the plaintiff company. None of the blue prints, originals or copies, were procured by the defendant or any of them, from the plaintiff company, but the originals had been sent by that company to railroad companies and one individual. . . . There was no express limitation on the part of the plaintiff company as to the use to which these prints should be put and no expressed restriction placed upon the ownership. The purpose was, however, understood by all parties."

. . . . . .

"The industry of counsel and our own examination have failed to find any decisions of any Pennsylvania courts ruling this proposition. In a great manufacturing community like ours this, or similar situation, frequently arises. . . .

"This case affords an excellent illustration. The chief engineer of the Pressed Steel Car Company promotes a company to enter into competition with his employer. Immediately upon the formation of the new concern a large number of employees in various departments of the old leave and enter the employment of the new. They bring with them, as is their unbounded right, the skill and experience as gained while working for the pioneer company. This would enable the new company to avoid many of the expensive experiments and mistakes of the old, and these engineers and draftsmen, with their knowledge of the construction of the cars and of the method of manufacture, according to their own testimony, should have been able to measure the cars made by the company and produce in a short time detailed and practical drawings from which the cars can be constructed. They did not do this, for the very obvious reason that blue prints of drawings were available and were accurate. It is idle to say that these drawings are of no value or of little value. . . . . They assist the new company to obtain the results of the experiments of the old in a shape that, at a glance, conveys more information to an engineer who makes the drawings than would the reading of a descriptive book or the examination and measurement of many cars. . . . The manufacturer does not abandon his property in a design by delivering it or a copy to another for a restricted purpose, nor by a limited publication. His property rights will be protected in such cases and he will be protected against a breach of trust, confidence or contract, and especially will he be protected against a breach of confidence existing between employer and employee. These principles are supported by a number of well considered cases.

"It is hardly necessary to cite authority for deciding that the bills of material must be retained to the plaintiff under the facts found. The excuse for taking them was that it was customary for draftsmen to make blue prints for their own work and retain them for their own use. If there be such a practice it is a reprehensible one. The principles underlying these cases have, however, a bearing upon the question of the other prints, viz.: a breach of the confidence necessarily arises out of the relation between the parties, that relation raising an implied contract. Broadly stated, it is that a court of equity will not permit any one to take an unfair advantage of a position in which he has been placed through any relation of confidence and trust, or, we think, through the necessities of, or as incident to a contract. . . . . When the Pressed Steel Car Company permitted its customers to have blue prints, it did not give them the right to a use which was not in the contemplation of both parties and which would give an unfair advantage to a competitor."

It is ordered in this case: "First—the defendant, the Standard Steel Car Company, is not entitled to the possession of the original blue prints of the Pressed Steel Car Company's cars and car plants, and must deliver them to the plaintiff.

"Second—The blue prints of bills of material now in the hands of the prothonotary are to be returned to the plaintiff.

"Third—All copies or tracings of drawings or of blue prints of drawings of the Pressed Steel Car Company are to be delivered to the plaintiff, whether the said copies have been made by the defendants or by third parties. For the purpose of identifying these copies and of ascertaining the necessary facts there should be a reference to an expert or examiner, unless the parties can agree to some other method of ascertaining the facts.

"Let a decree be drawn in accordance with the foregoing and enjoining the defendants from using any of the blue prints or copies thereof. The defendant, the Standard Steel Car Company, to pay the costs."—Pressed Steel Car Company v. Standard Steel Car Company and others (Reported by Cleveland *Iron Trade Review*); Court of Common Pleas of Pennsylvania.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

A Correction.

Sir.—I have just noted in your issue of July 18 that Mr. W. McA. Johnson, in his article on An Experimental Reverberatory Furnace, stated that I was formerly connected with the Nichols Chemical Company. This confusion no doubt arose from the fact that I was for some time at Laurel Hill, L. I., being employed, however, at the General Chemical Company's plant of that place.

For the sake of accuracy will you be kind enough to give space for this correction?

New York, Aug. 2, 1903. W. M. SANDERS.

The Kalion Chemical Company.

Sir.—We notice in your issue of July 11, 1903, on pages 55 and 56 an article headed "Chromium and Chrome Ore in 1902," by Joseph Struthers and Henry Fisher, and described in a footnote as: "From advance sheets of 'The Mineral Industry,' Vol. XI., now in preparation."

In the article the following appears in the first column, page 56, lines 13 to 19: "The plant of the Baltimore Chrome Works has been sold for $1,000,000 to the Kalion Chemical Company of Philadelphia. This company supplies the greater part of the potassium chromate and bichromate salts used in tanning and dyeing in the United States, its output being manufactured from ore imported from Turkey."

We beg leave to say that this company did not buy the Baltimore Chrome Works, and is not now, nor has it ever been, interested in the ownership of the Baltimore company. We distinctly object to the publication of this misstatement of fact either in your JOURNAL or in the volume of "The Mineral Industry" now in preparation. We must therefore ask you to give as wide publicity to a correction of the statement as possible and at the same time assist us in having the correction made in "The Mineral Industry" before the volume appears.

Our reasons for writing this are good and sufficient, though we shall not state them here. The fact that we wish the correction made, we trust, will be sufficient to accomplish the desired end.

KALION CHEMICAL COMPANY,
George R. Bower, Treasurer.

Philadelphia, Pa., July 28, 1903.

[The correction will be made as requested. The statement referred to went the round of the press without contradiction.—EDITOR.]

Bessemer Memorial Fund.

Sir.—As there appears to be some confusion and misunderstanding in the public press and in other quarters in regard to the combined Bessemer Memorial and College of Technology schemes, I am directed to request you to be good enough to give publicity to the following statements to obviate further misconceptions:

The Bessemer Memorial proposals have been framed with a full knowledge of, and with due regard to, the proposals outlined in Lord Rosebery's letter to the London County Council—indeed those responsible in each case have been in close consultation throughout. The two schemes, however, must necessarily continue for the present to be directed separately, though they will be controlled by joint-trustees.

There is no danger of antagonism or overlapping in regard to the schemes themselves or to existing educational institutions. The central idea of the proposed college for advanced specialized training in technology is to supplement and complete the training afforded by existing colleges. By uniting forces and by interchange of students and subjects, the best possible use of facilities now available at South Kensington and elsewhere will be assured, and the new college will be the centre for advanced scientific technology not only for Great Britain, but for the whole Empire. It is admitted on every hand that such a central organization is imperatively demanded by ever-increasing industrial requirements in regard to efficiency, not merely of the rank and file, but of the leaders of all branches of industry.

As regards the Bessemer Memorial, the aim of the committee throughout has been to unite all sections of the mining, metallurgical and engineering industries to do honor to the memory of one of the world's greatest benefactors in a manner best calculated to advance the industries to whose remarkable development Bessemer so largely contributed. As stated in the resolution proposed by the Duke of Norfolk and unanimously adopted at the Mansion House meeting,

the memorial is an "educational work as far-reaching in its beneficent influence as are the results of Bessemer's great invention."

For the purposes of the advanced metallurgical training and specialized research works it is proposed that London shall be regarded as the center for the metallurgy of copper, silver, gold, etc.; Sheffield as the center for steel; and Birmingham as the center for cast and wrought iron and alloys. This decision will not, however, prejudice the claims of other metallurgical centres for participation in the Bessemer Memorial Fund. It is also intended that the post-graduate scholarships shall, in part, be international.

It has been impossible so far to do more than indicate the general lines of the combined schemes, but it is hoped that the details, which necessarily demand the most careful attention, may be sufficiently advanced to enable the committee to submit the complete scheme in October. Meanwhile any communication on the subject addressed to the undersigned will receive due attention.

I am further authorized to state that in addition to the expressions of approval from the King and Prime Minister conveyed to the Mansion House meeting, the combined schemes are receiving the most cordial and active support of His Majesty's Government and of educational authorities in London and the Provinces.

C. McDermid.

London, July 21, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Canvas Tables.—Where are canvas tables used in the United States? Where can any information be obtained concerning them?—H. H.

Answer.—Canvas tables have been used chiefly in California, in the mines along the Mother Lode. The plants are generally small. The largest in use were in some of the mines in Nevada County. The Utica Mine at Angels, in Calaveras County, also had a canvas plant. These plants were used at some of the older mines in Colorado. You can find references to them in T. A. Rickard's "Stamp Milling"; Louis' "Milling of Gold Ores," and in other works on milling practice.

THE PRESENT CONDITION OF SULPHURIC ACID MANUFACTURE.

At the meeting of the International Congress for Applied Chemistry at Berlin, June 4, 1903, Dr. G. Lunge reviewed the present condition of the sulphuric acid industry from the manufacturing standpoint. He called attention to the increasing use of pyrites and also of blende as source of the sulphur. In the designing of burners for lump pyrites, there have been no changes; for burning fines, the most advantageous construction appears to be furnaces of the Herreshoff type, with air cooling. An objection to this form of furnace, however, is the enormous quantity of flue dust they produce. The greater part of the production of sulphuric acid, including all which is not marketed in a concentrated form, is still produced by the lead-chamber process. As to the various advantages of the chamber process and the contact process, a final judgment cannot yet be reached. However, the chamber process, in order to keep alive, must not only be operated at the lowest possible running expense, but also the first cost of the plant must be reduced to a minimum. It has been found advantageous to introduce the aqueous vapor into the chambers largely in the form of a spray, whereby the expense of its conversion into steam is saved, and also the chamber space can be reduced. Nevertheless, steam cannot be entirely dispensed with; the last chamber of a series must always be run with injection of steam.

An important advance in the art of sulphuric acid manufacture has been the operation of the chamber system by mechanical draught. There has been lately considerable discussion as to whether the more advantageous place for the fans is before or behind the chambers, but as to this there is not yet any general agreement. Instead of fans made of hard lead, which are subject to rapid corrosion, fans constructed of earthenware may be used.

As to the general arrangement of plant, the new circular, tangential chambers of Dr. T. Meyer, and the intermediate reaction towers are to be considered. The reaction towers save a good deal in chamber space, but it is doubtful if they can completely replace the chambers.

The purification of sulphuric acid made from pyrites, especially to remove any arsenic it may contain, has become an important matter. This is done exclusively by precipitation with hydrogen sulphide. The sulphuric acid made by the contact process, when properly conducted, is pre-eminently free from arsenic. In the concentration of acid excellent results are obtained with the Kessler apparatus by which a concentration to 96 per cent, without the formation of that acid mist, is very economically effected.

A large quantity of fuming sulphuric acid, and also the ordinary concentrated acid, is now made by the contact process, which process is employed by a large number of manufacturers, especially manufacturers of acid for use in making nitro-glycerin. The statistics of the world's production of sulphuric acid are difficult to arrive at because of the various degrees of strength of the acid as marketed. From the most reliable data, it appears that in 1900 Great Britain made about 1,000,000 metric tons and the United States about 940,000, while in 1901 Germany made about 880,000 tons, these quantities being reckoned as pure sulphuric acid. In point of quantity, therefore, the sulphuric acid industry surpasses by far all other branches of chemical industry.

PRODUCTION OF SODIUM CARBONATE.—In a paper read before the International Congress of Applied Chemistry at Berlin, in June, 1903, E. Solvay presented statistics showing the comparative make of sodium carbonate by the Solvay process and the Le Blanc process. The first batch made by the Solvay process was sold in Belgium in 1863. In the early part of the last decade the output of Solvay soda ash surpassed that of the Le Blanc soda ash. Since that time the Solvay product has been making large and steady gains at the expense of the older process, and in 1902 out of a total estimated production of 1,760,000 metric tons, only about 150,000 metric tons were made by the Le Blanc process.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Engineering and Mining Journal upon receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the Journal in which notice of the patent appeared.

Week Ending July 28, 1903.

734,499. ELECTROLYTIC APPARATUS FOR RECOVERING METALS FROM THEIR COMPOUNDS.—Charles E. Baker and Arthur W. Burwell, Cleveland, Ohio. An electrolytic apparatus for recovering metals from their compounds, comprising an electrolytic cell having a liquid cathode of a metal which is more volatile than the metal to be recovered; means for distilling the amalgams or alloy produced in the electrolytic cell; means for condensing the vaporized cathode metal, and connections between the electrolytic cell, distilling means and condensing means.

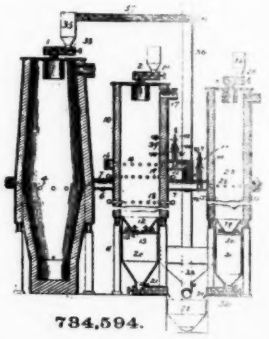
734,515. ROCK-DRILL BIT.—Horatio Collins, Witwatersrand Gold Fields, Transvaal, South Africa. In a hand rock-drill or rock-drill bit the combination with the drill or bit formed with angular grooves or slots across the end thereof made tapering from the center to the edge of the drill, of removable cutting-teeth having their bases made with a corresponding taper in the direction of their lengths and adapted to be fitted into the tapering angular grooves in the drill end and means, located in the center of the drill, engaging the inner ends of the teeth to lock them in position.

734,522. PROCESS OF NICKEL-PLATING.—Thomas A. Edison, Llewellyn Park, N. J. The process of forming an adherent coating of metallic nickel on iron or steel, which consists in electrolytically depositing metallic nickel on the iron or steel, and in then subjecting the nickel-plated iron or steel to a welding temperature in a non-oxidizing atmosphere.

734,523. COMBINED HOT-BLAST OVEN AND DUST-COLLECTOR.—Henry W. Edward, Oakdale, Ga., assignor to the Loder Pyritic Reduction Company, Boston, Mass. The combination of a chamber having an inlet and an outlet for hot furnace-gases, of a series of pipes arranged vertically in staggered relation within the chamber, and connected to form a continuous conduit for a blast, and means for supplying the blast to the end pipe nearest the outlet of the chamber, said pipes offering less obstruction to the passage of the gases at the outlet end of the chamber than at the inlet end.

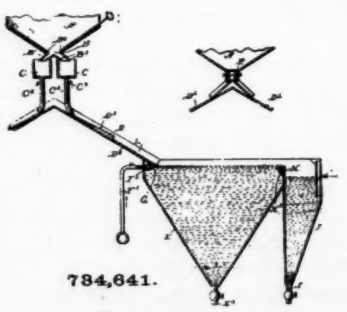
734,592. COKE-RECEIVER AND LOADER.—James McClellon, Everett, Mass. In an apparatus of the class described, a gravity-pan adapted, without a change of position, to receive coke from an oven and discharge it into a car, means to retain the coke in a pan while it is being quenched, and means to deflect from the car the water which drains from the pan.

734,594. SMELTING APPARATUS.—Paul Naef, New York, N. Y. Smelting apparatus consisting of a blast-furnace, a coking-oven and a limekiln, means for conducting gas from the blast-furnace to the coking-oven and the limekiln, means for mixing the solid products from coke-oven and the limekiln with ore, and means for condensing said mixture to and discharging it into the blast-furnace.



734,594.

734,641. ORE-SEPARATOR.— Charles F. Wheelock, Birmingham, Ala. The combination of a vessel adapted to be filled with water and provided with means for precisely determining the level of the water, a chute declining toward and adapted to reach said level; a transverse water pipe slightly below the water-level, approximately parallel with and in proximity to the discharge edge of the chute and discharging laterally in the same general direction as the chute; means for delivering water under pressure to said pipe; means for regulating said pressure, and means for causing a thin uniform stratum of dry graphite to descend the chute.



734,641.

734,618. AMALGAMATORS.—Gerard C. Scott, Columbus, Ohio. An amalgamator, embodying a rotatable casing, a series of spaced longitudinal substantially parallel amalgamated plates within the casing and terminated short of the opposite ends thereof, a tubular journal piercing one end of the casing and forming an inlet communicating with the space between the said end of the casing and the

adjacent end of the series of plates, a baffle disposed across the open inner end of the tubular inlet, and an outlet at the opposite end of the casing.

734,640. MINE-CAR SPRING-BUMPER, DRAW-BAR AND AUTOMATIC COUPLING.—Richard S. Weitzell, Marion, Ky.—In a draft mechanism, a reach-bar, draw-heads slidably mounted on the reach-bar, and springs interposed between the ends of the reach-bar and the draw-heads.

734,678. COMPOSITION OF MATTER FOR CEMENT-PLASTER.—Almo de Monco, Denver, Col. A composition of matter consisting of aluminous flint-clay, silicious clay and plaster-of-paris.

734,679. COMPOSITION OF MATTER FOR CEMENT-PLASTER.—Almo de Monco, Denver, Col.—A composition of matter consisting of silica, flint-clay, silicious clay, plaster-of-paris and a binding and retarding agent such as animal, vegetable or mineral fiber.

734,683. PROCESS OF OBTAINING GOLD FROM SEA WATER. John F. Duke, London, England. A process of obtaining gold from sea water which consists in introducing a substance which will form a haloid with the halogen of a gold salt into a reservoir dug out of a cliff at or near the shore, said cliff being composed of a material capable of precipitating gold, allowing sea water to flow by the natural rise of the tide into said reservoir, allowing the water to remain in said reservoir in contact with said substance for some hours, then after the settling of the sludge running off the sea water, repeating the above process once or oftener if necessary until the sludge is sufficiently rich in gold, and then treating said sludge to recover the gold.

734,684. SAFETY BLASTING-CARTRIDGE.—Thomas F. Durham, Philadelphia, Pa. In a blasting-cartridge, an inner and outer receptacle, each having a closed lower end, a fire-extinguishing agent in the outer receptacle in which the inner receptacle is immersed, an explosive in the inner receptacle, arms on the ends of the inner receptacle, each of which extends diagonally beyond the end of the inner receptacle and engages the ends of the outer casing at the inner periphery thereof.

734,708. DRILL-SHARPENER. Jeremiah H. Hicks, Central City, S. D. In a device of the character described, the combination with means for supporting the cutting end of the drill, of spring-actuated means for elevating the drill, and means actuated by the operator for intermittently rotating and depressing the drill.

734,710. PROCESS OF TREATING MINERAL LIQUID HYDROCARBONS.—Charles Hornbostel, New York, N. Y. In the combustion of mineral hydrocarbons a process for converting mineral liquid hydrocarbons into a gassified and purified state and for mixing said purified and gassified mineral liquid hydrocarbons with air, consisting in saturating with mineral liquid hydrocarbons and with vaporized mineral liquid hydrocarbons a mass of earthy substances known as fullers' earth and an earth known as infusorial earth and in geology as kiesel guhr, and in arranging a mass of said earth as a seal in a compartment and in forcing air into said compartment and out again through said saturated earthy substances sealing said compartment.

734,713. PROCESS OF MAKING HYDRATES OF ALKALINE EARTH DIOXIDE.—George F. Jaubert, Paris, France. The process of making hydrates of the alkaline earth dioxides by causing a solution of an alkaline earth sulphide to react by double decomposition upon a solution of a hydrate of an alkaline dioxide.

734,743. COMPOSITION OF MATTER FOR USE AS FUEL.—Alfred Paul, Melrose Highlands, Mass. A composition of ingredients herein described, consisting of coal-dust, screenings of waste, wood-sawdust, resin, sour beer (alcoholic) and molasses, mixed together, to form a fuel from coal-dust.

735,758. HEAD MOTION FOR ORE-CONCENTRATING TABLES.—Lewis Searing, Denver, Col. In a head-motion for ore-concentrators, the combination of a part to be actuated, and variable-speed actuating means consisting of a curved reciprocating shoe for varying in one direction of movement of the actuated part and at a speed gradually increasing throughout said movement the relative motion of the shoe and the part to be actuated, by shifting the point of contact between the two along the surface of the part to be actuated during reciprocation.

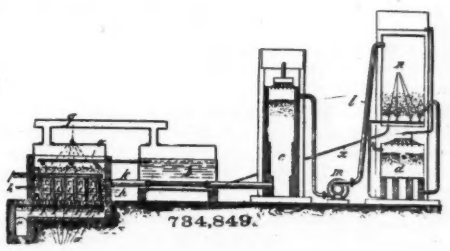
734,795. PROCESS OF REDUCING HOT METAL BARS INTO SHEETS.—Thomas V. Allis, Bridgeport, Conn. A process of producing metal sheets in a heated state, which consists in the employment of a bar in weight per lineal foot, a multiple of a multiplicand having any number for its multiplier, and which multiplicand represents the weight per lineal foot of a sheet or tin-plate bar of which two or more are required to constitute a pile or pack to produce such sheets, reducing said bar into a plate, making said plate into one or more piles or packs and reducing the piles or packs to produce sheets of the required gauge.

734,818. DUST-CHAMBER FOR FURNACES. Franz Cazin, Denver, Colo., and Llewellyn J. W. Jones, Tacoma, Wash. A dust-chamber having an inlet and an outlet at its ends for the gas or air, and a series of longitudinal partitions extending in the direction of the draft or current and subdividing the chamber between its inlet and outlet into a plurality of open-ended passages of less height than width, the said partitions being substantially inclined to a vertical plane passing longitudinally through the chamber.

734,828. STAMP MILL.—Winnall A. Dalton, Tucson, Ariz. In a stamp-mill, driving means, comprising in combination, a connecting-rod adjustably clamped to a bowed spring carrying at its outer ends flexible members attached to a cross-head in which is revolubly mounted a stamp-stem, a cross-head, a bowed spring, flexible connections between the ends thereof and the cross-head, and a crank-shaft connected with said spring, and means for adjusting the connection between the spring and the crank-shaft, and means for rotating the stamp-stem, said means for rotating the stamp-stems consisting of vertical worm-gears on the stems, and a horizontal worm engaging said gears, the worm being driven by the crank-shaft.

734,844. APPARATUS FOR PRODUCING AND DEPOSITING FUMES FROM ORES.—William W. Fyfe, Wood Green, England. Apparatus for producing and depositing fumes from ores comprising in one structure a set of furnaces, flues communicating therewith and with each other, passages at each end of the said flues provided with division and baffle walls, and doors and dampers or valves in the said passage.

734,849. PROCESS OF MAKING SULPHURIC ACID.—Gustave Gin, Paris, France. An improvement in the art of manufacturing sulphuric acid, consisting in first cooling the gases of sulphureted ores as the former come from the furnace, and ridding them of the solid matters held in suspension, by deposit, then subjecting them to refrigerative action, next depriving them of sulphuric anhydride



734,849.

by washing with sulphuric acid, after that spraying them with cold water slightly acidulated with sulphurous anhydride, then submitting them to a heating action, next conducting the saturated solution, by this time formed, through a bed of refractory material, when it divides itself and begins to lose its sulphurous acid by contact with an air mixture, and finally expelling the sulphurous anhydride from the liquid bed by hot air bubbled up from beneath, which mixes sufficiently with the sulphurous anhydride to realize the integral oxidation in the catalytic operation.

734,867. AMALGAMATOR.—Thomas H. Hicks, Fort Wayne, Ind., assignor to the Hicks Gold and Silver Extraction Company. In combination, a rotative cylinder having an open head at each of its ends; an annular flange extending from each of said heads; a smooth bearing surface and a rack parallel therewith arranged on each of said flanges; a cylinder having a roller and pinion projecting from each of its ends, said rollers and pinions engaging respectively with said bearing surfaces and racks and being adapted to roll thereon.

734,894. BASKET FOR HOLDING TIN SCRAPS.—Martin Laernoes and John Dunn, Streator, Ill., assignors to the Vulcan Detinning Company, New York, N. Y. A basket for holding tin scraps, consisting of perforated side and bottom walls, reinforcing irons at the corners, yokes or bails at the upper ends of said basket, laterally-extending handles attached to said bails, one of said handles being a conductor for the electric current and separated from the upper ends of the yoke or bail by layers of tin or tin-foil, the shank of said handle being attached to the upper ends of the yoke or bail by fastening-bolts.

734,898. APPARATUS FOR TRANSPORTING FILTERING PLATES, ETC.—Valentine Lapp, Lindenau, near Leipzig, Germany. In a hydraulic filtering press, having a truck adapted to be freely moved along over the filtering elements, and a block and tackle suspended from said truck and adapted to lift any one of said elements, the combination with said truck, and block and tackle, of a rope or chain extending to and fro along the path of said truck, and having one length carried by and suspended from the latter and having the block and tackle carried by and suspended from the respective part of said length; a rope or chain pulley located at one end of the path of the truck and having the said rope or chain pass around it; a hydraulic cylinder and piston located at the other end of the said path and having both ends of the rope or chain fixed to one of its two parts, and relatively stationary means for operating said hydraulic cylinder and piston from any place along the length of the press.

734,901. APPARATUS FOR MEASURING COAL OR THE LIKE.—Bradford Leslie, Harrow-on-the-Hill, England. In combination, a measuring wheel having pockets in its periphery, a projection on each pocket, a hopper, and a chute hinged to the hopper and having its bottom wall extending throughout at an inclination, said chute adapted to extend in the path of the said projections and to prevent the sticking of and to insure a discharge of the coal from the hopper.

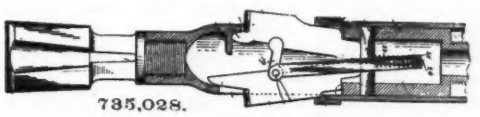
734,904. CONTROLLER FOR HYDRAULIC AIR COMPRESSORS.—William J. Linton, Woodstock, Canada, assignor to the Taylor Hydraulic Air Compressing Company, Limited, Montreal, Canada. The combination with the air-supply pipes of a hydraulic air-compressor of the class described, of means for automatically controlling the passage of air through said air-supply pipes.

734,950. MANUFACTURE OF PEROXIDE OF LEAD.—Erwin Quedenfeldt, Dulsburg, Germany, assignor to Chemische Fabrik Griesheim Electron, Frankfort-on-the-Main, Germany. A process for the direct conversion of lead oxide into lead dioxide, which consists in forming an emulsion of the lead oxide with a concentrated solution of an alkali chloride, subjecting the same to electrolysis, and keeping the emulsion in motion during the electrolytic action.

734,958. MINE-CAR.—William H. Roach, Gilliam, W. Va., assignor of one-fourth to Joel T. Adams, Graham, Va. The combination of a brake-bar, brake members mounted on said bar, a rotary cam-plate in engagement with said brake-bar and adapted to force said brake members into and out of operative position, a yielding buffer, and connections between said yielding buffer and the cam-plate whereby the yielding of the buffer rotates said cam-plate to apply the brake member.

735,022. REFRACTORY BRICK OR ARTICLE.—Frank J. Tone, Niagara Falls, N. Y. A baked refractory article composed of a refractory material non-coherent when used alone mixed with and bonded by carborundum.

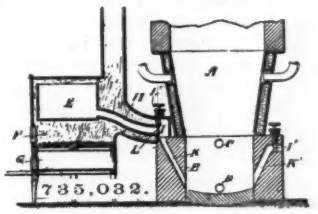
735,028. ROCK-DRILL.—Otto G. Worsley, Newark, Ill. In combination, a chambered stock having apertures in the opposite walls thereof, expansible cutters housed within the



735,028.

chamber and one of which is movable longitudinally, and a link engaging the cutters and adapted when the latter cutter is moved longitudinally to thrust the cutters through the aperture.

735,032. PROCESS OF SEPARATING PRECIOUS METALS.—Franklin R. Carpenter, Deadwood, S. D., assignor of one-half to Joseph H. Berry, Detroit, Mich. An im-



735,032.

provement in the art of separating gold and silver from ores which consists in smelting the ores to produce a matte and while the matte is still fluid maintaining a bath of molten lead which is caused to flow beneath the matte, and to extract the precious metals therefrom.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending July 4, 1903.

16,238 of 1902. TITANOUS CHLORIDE.—H. Spence, Manchester. Method of production of titanous chloride on a commercial scale, by electrolyzing a solution of titanic chloride.

19,981A of 1902. REDUCING LEAD TO POWDER.—Union Lead and Oil Co., New York, U. S. A. Producing lead in the form of an impalpable powder by the action of rapidly moving beaters on molten metal.

3,768 of 1903. ZINC-BARIUM PIGMENT.—W. J. Armbruster and J. Morkn, St. Louis, U. S. A. Improved method of making pigments of zinc hydrate.

8,591 of 1903. TREATING FINE IRON ORES AND BARIUM SULPHATE.—A. D. Elbers, New York, U. S. A. Preparing fine iron ores for the blast furnace, by incoroporating, by means of pulverized blast furnace slag, and burning the mixture to clinkers in a rotary kiln.

9,501 of 1903. DREDGE.—R. Andrew, Melbourne, Victoria. Improved method of suspending buckets and suction pipes on dredgers for river beds.

5,604 of 1902. TREATING MANGANESE STEEL.—R. A. Hadfield, Sheffield. In toughening manganese steel, heating it very slowly to 750° or 800° C., and then rapidly heating up to the temperature at which it is to be quenched in water.

ANNOUNCEMENT.

The statement regarding the appointment of Dr. Struthers to the editorial department of the American Institute of Mining Engineers, has led to a regrettable confusion, in that several of our readers have assumed that Mr. Theodore Dwight's position is affected. The latter is in no way the case, for Mr. Dwight remains assistant secretary.

PERSONAL.

Mr. E. Van Cortlandt, of Denver, is in New York.

Mr. Maurice Clère, of Paris, France, is at Nacozari, Mex.

Mr. Robert Jacobs has returned to Rossland, B. C.

Mr. Geo. A. Schroter, of Denver, is now at Boise, Idaho.

Mr. Jas. I. Cowan sailed per steamer *Teutonic* on August 5.

Mr. Mervin S. Stutchbury has left London for the Caucasus.

Mr. Jas. W. Abbott, of Denver, is now at Portland, Ore.

Mr. Horace C. Mitchell, of Denver, has gone to Tonopah, Nev.

Mr. Ernest du B. Lukis has opened an office in the City of Mexico.

Mr. E. L. Carpenter, of Wilkesbarre, Pa., is at Salt Lake City.

Mr. Stuart Croasdale has returned to Denver from a professional trip.

Mr. F. G. Williams has arrived from London, and is in New York.

Mr. Woolsey McA. Johnson has taken up residence at St. Louis, Mo.

Mr. A. C. Beatty has returned to Denver after a protracted stay in Mexico.

Mr. S. R. Trengove, of Lake Linden, Mich., has gone to Sefwhi, West Africa.

Mr. C. W. Pritchett, of Denver, has returned from professional work in Wyoming.

Mr. Geo. J. Bancroft, of Denver, is examining mines in the La Plata Mountains, Colo.

Mr. C. L. Dignowity recently returned to Salt Lake, Utah, from Boulder County, Colo.

Mr. Jas. W. Malcolmson, of El Paso, is now in California, taking a month's holiday.

Mr. Auguste Mathez, on his return from Topia, Durango, Mex., has arrived in New York.

Mr. Chas. H. Macnutt sailed on August 4, per steamer *Allianca*, en route to Valparaiso, Chile.

Mr. Wm. Lawrence Austin, of New York, has gone to Copperopolis, in Calaveras County, California.

Mr. Jose E. Pemberthy, of Houghton, Mich., has been examining properties in Arizona and Mexico.

Mr. H. D. Smith, recently with the Tomboy Company, of Telluride, Colo., has been in San Francisco, Cal.

Mr. Edwin E. Chase has returned to Denver from a six weeks' absence on professional work at Parral, Mex.

Mr. Arthur Scranton, of Buffalo, N. Y., has resigned as superintendent of the Lackawanna Steel Company.

Mr. F. B. Sherwood, lately in West Africa, passed through New York last week on his way to Baker City, Ore.

Mr. W. H. Binney, of De Lamar, Nev., has been appointed manager of the Dewey Estate mines at Pearl, Ida.

Mr. Friedrich Correll, director of the Humboldt Engineering Works Company, near Cologne, is visiting this country.

Mr. Horace G. Nicols has been appointed superintendent of the Republican Mining Company at Jacksonville, Cal.

Mr. Alexander Hill and Mr. Chas. H. Stewart have gone into partnership, with offices at 34 Old Broad street, London.

Mr. W. B. Mucklow, of Hartford, Conn., president of the Majestic Copper Co., at Milford, Utah, is visiting in California.

Mr. W. M. Courtis, of Detroit, has gone to Cody, Wyo., to direct drilling work for the United States Potash Company.

Mr. P. J. Yerly, of Chicago, has been appointed manager of the Park County Coal Company's mines, at Bozeman, Mont.

Mr. Robert Bell, of Ottawa, Can., director of the Canadian Geological Survey, is spending the summer at Sydney, Cape Breton.

Mr. W. Kraft, part owner of the Descubridora Mine, near Chihuahua, Mexico, returned recently to Chihuahua from New York.

Mr. Forbes Rickard has returned to Denver after inspecting the properties of the Hays Mining Company, near Nogales, Mex.

Mr. William N. Cummings, superintending engineer for the Dwight-Furness Company, is now located at Guadalajara, Mex.

Mr. G. Caesar has resigned his position as superintendent of the Federal Lead Company at Flat Creek, Mo., and is now in St. Louis.

Mr. Robert Mitchell, metallurgist to the Greene Consolidated Copper Company, has resigned. The resignation takes effect September 1.

Mr. Juan Felix Brandes, of Denver, is at present examining the properties of the Fraser Mountain Copper Company, in Taos County, N. M.

Mr. Sarat C. Rudra, mining engineer to the Rajah of Kurupum, India, is in New York City, with a view to investigating the preparation of graphite.

Mr. Alexander D. Moffatt, of Phillipsburg, Mont., has been appointed resident superintendent of the Ontario Mining Company at Park City, Utah.

Mr. Edgar M. Ray, formerly of Aspen, Colo., but now in charge of a mining property in Mexico, has been examining the Atlanta Mine at Atlanta, Ida.

Mr. H. C. Bonnevie, of Bonnevie & Lee, Denver, Colo., with Mr. G. H. Morris as assistant, is examining the property of the Lexington Hill Gold Mining Company, near Deadwood, S. Dak.

Judge George Gray, of Wilmington, Del., is to act as the fifth member of the Alabama Coal Strike Commission. He accepted the appointment conditionally upon the work being done during August.

Mr. R. Gilman Brown, of San Francisco, has added to his engagements the general management of the Republican Mining and Development Company, with mines at Jacksonville, in Tuolumne County, Cal.

Mr. H. A. McKenzie, formerly superintendent of the Independence Mine, Cripple Creek, Colo., recently returned from Alaska and has been examining the properties of the White Pine Copper Company, near Ely, Nev.

Mr. L. W. Searles has resigned as superintendent of mines for the Virginia Iron, Coal and Coke Company, at Barren Springs, Va., to become superintendent of ore mines and quarries for the Embree Iron Company, at Embreeville, Tenn.

Mr. Lindsay Duncan, instructor in civil engineering in Cornell University, has been elected professor of civil engineering in the University of Colorado, at Boulder, succeeding Prof. Charles Derleth, who resigned to accept the associate professorship of civil engineering in the University of California.

SOCIETIES AND TECHNICAL SCHOOLS.

Cornell University.—Appointments have been made as follows: J. I. Hutchinson and Virgil Snyder, assistant professors of mathematics; J. S. Shearer and Ernest Blaker, assistant professors of physics; W. N. Barnard, assistant professor of machine design; C. S. Hirshfield, instructor in experimental engineering; R. Stevenson and I. Baum, assistants in chemistry; L. O. Veser and R. C. Fenner, assistants in physics.

INDUSTRIAL.

Mitchell & Turner, of Butte, Mont., dealers in mining machinery, have received from London a request for plans for a large reduction plant to be shipped to Western Australia.

The Solvay Process Company, of Syracuse, N. Y., and Detroit, Mich., is about to begin work on the new coke plant to be erected on a tract of 193 acres on the Calumet River, South Chicago.

The Damascus Nickel Steel Company has its new open-hearth furnace at Carnegie, Pa., nearly completed, and expects to have its new 10 in. and 16 in. mills in operation about August 15.

The Baldt Steel Company is preparing to erect a new steel plant for the manufacture of steel castings at New Castle, Del. There will be three buildings, each 65 by 300 ft. The grading contract has been let.

The Denver Steel Casting Company, recently incorporated, has absorbed the Colorado Steel Casting Company which owns all the rights of the Atlas Car Coupling Company. Work is to start at once on a plant in Denver.

The Lorain Steel Company, of Lorain, O., a constituent company of the United States Steel Corporation, is erecting two additional furnaces at Lorain, each 85 by 22 ft., and of an annual capacity of about 150,000 tons.

The General Electric Company has built the largest electric locomotive in the world for the Baltimore & Ohio Railroad. It is 2,000 h. p. capacity, and is designed to haul a freight train weighing 1,500 tons up a 1.5 per cent grade.

The Henry S. Mould Company, of Pittsburg, Pa., has recently shipped a complete briquetting plant with a capacity of 50 tons per day, to the Descubridora Mining and Smelting Company, of Descubridora, Mex. This plant will operate on fine copper ores and flue dust.

The Mine and Smelter Supply Company, of Denver, recently filled an order for about 30,000 ft. of 4 and 6-in. pipe for the water works at Sterling, Colo. The company is building a number of 5-ft. Huntington mills, for various milling companies in Colorado, Arizona and elsewhere.

The National Steel Foundry, recently organized at New Haven, Conn., to engage in the steel business, has purchased a large tract of land near the National Wire Mills. About $400,000 of the capital has been paid in. The officers are: Henry L. Hotchkiss, president; H. Stuart Hotchkiss, treasurer; Eugene Buckman, secretary, and Maribau Simms, general manager.

Ed. L. Van Nierop & Co., of Kobe, Yokohama and Moji, Japan, have started an engineering department for the designing and construction of complete power and lighting plants, mining installations, factory equipments, etc. The department will be under the management of Andre Schmidt, who is at present in Europe.

The United Engineering and Foundry Company, of Pittsburg, Pa., recently installed pipe bending rolls 22 ft. long, and capable of bending pipe up to 20 in. in diameter at the American Works of the National Tube Company, at Youngstown, O. Another order for a similar set of rolls has been received for installation at the National Tube Company's Middletown, O., plant.

It is officially stated that the Consolidated Lake Superior Company has so far sold about $1,250,000 of the new 4 per cent bonds. This means $750,000 of the $2,450,000 new cash needed, or a little less than a third. The whole present loan of $5,050,000 was financed by Speyer & Co., who are thus virtual proprietors of about a 53 per cent interest in the company's franchises and other assets.

The J. H. Montgomery Machinery Company, of Denver, Colo., has sold recently a crushing plant for the Lavaline Manufacturing Company, of Denver; several derricks for placer work to J. L. Weaver, of Mountain Home, Ida.; a hoisting plant to Fogerty & Dickinson, of San Luis Potosi, Mex.; a crushing plant for Fogerty & Dickinson's mill at Santa Barbara, Chihuahua, Mex.; machinery for a 100-ton cyanide plant to the Pacific Reduction and Refining Company, at Chloride, Ariz.; a 10-stamp mill and other machinery to the Bismark Nugget Gold Mining Company, at Sheridan, Mont.; and a ¾-mile tramway to the Clara Belle Mine, at Allen's Park, Boulder County, Colo.

TRADE CATALOGUES.

The Edward Christman Company, of Massillon, O., issue a little folder calling attention to its long experience in drilling artesian or oil wells, test-holes for coal or other minerals, or for foundations, bridges, piers, etc., and the work the company undertakes for contractors.

The Vajen-Bader Company, of Indianapolis, Ind., describes and illustrates in a 16-page pamphlet the types of the Vajen-Bader head protector and its use in saving life and in rescuing persons overcome by smoke or noxious gases in mines, steamships, refrigerating works, etc.

In a recent issue of its *Record of Recent Construction* the Baldwin Locomotive Works, of Philadelphia, Pa., publishes particulars of current types of construction without attempting to formulate a complete scheme of types and sizes of locomotives. The pamphlet gives valuable information pertaining to dimensions of a great variety of locomotives of different gauges and for different kinds of service.

The Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., issues an 8-page folder describing its regulating and reversing controllers of the commutator type for controlling series, shunt or compound-wound direct-current motors where variations in speed, frequent stops and reversals are required, speed control being obtained by varying the resistance in series with the motor armature.

The Model Gas Engine Company, of Auburn, Ind., publishes an illustrated 32-page catalogue describing the various types and sizes of gas engines it manufactures, including stationary, portable, pumping and hoisting engines, operated with gasoline, gas, kerosene, crude oil and natural or producer gas. Attention is called to special features of construction and to the simplicity and durability of the Model engines.

The Buffalo Forge Company, of Buffalo, N. Y., issues a handy little catalogue describing its various types of gas blowers and exhausters for moderate and high pressure, with dimensions and price list. Types of exhausters for chemical and acid fumes and those

for special service are also described. The catalogue also describes and lists the company's blast gates "of the slide and lever type" for regulating the air supply, and its gate valves and oil ring bearings.

The F. M. Davis Iron Works Company, of Denver, Colo., in its catalogue No. 39, a little 8-page pamphlet, announces the establishment of an ore testing plant at its works for assaying and testing ore in any quantity up to ton lots. The ore testing plant, at 1737 Champa street, is designed to sample carload lots by cutting out 2,000-lb. samples, these samples being tested by any of the modern milling or hydro-metallurgical methods. The plant is thoroughly equipped. The pamphlet contains a schedule of prices.

SPECIAL CORRESPONDENCE.

Denver. Aug. 1.

(From Our Special Correspondent.)

On July 27, Judge Hallett, of the United States Circuit Court, Denver, dismissed the complaint of the Sloan Filter Company, against the Portland Gold Mining Company, for alleged infringement of patent on a filter consisting of sheet lead or steel plates covered with lead. The plaintiffs took the action primarily as a means of establishing the legality of their patent, which had been assailed by claims that the process had been used before. In dismissing the case, Judge Hallett stated that he found the testimony to show that John E. Rothwell had used metal and asbestos plates as filters in 1890, before the granting of the Sloan patent. The Rothwell filter had therefore disposed of the claims of the Sloan filter to originality.

Col. J. Q. McDonald and Mr. H. R. Lutes have been appointed by the United States Court of Bankruptcy appraisers for the Rocky Mountain Smelting Company, of Florence. The original owners of the plant are trying to secure it again. It cost several hundred thousand dollars to construct as a pyritic smelter and to change to a lead smelter. After completion, it was operated in a desultory manner for about a year and then closed. It has been idle for over a year. A large part of the stock of the company is held by Iowa farmers.

The inevitable results of the extreme utterances and general position of the Western Federation of Miners continue in evidence throughout the State. On July 27 four Austrian non-union miners from Butte, Mont., soon after their arrival at Victor, Colo., were escorted to the edge of the camp by a committee of union miners and ordered never to return, the order being emphasized by a volley of revolver shots fired into the air. On July 28, Charles H. Moyer, president of the Western Federation of Miners, was arrested in Leadville for carrying concealed weapons, held in jail the greater part of the day, and fined $50 and costs, a total of $62.10, which was paid, his revolver being confiscated.

On the night of July 28 the transformer plant of the Sun & Moon Mine, near Idaho Springs, was destroyed by dynamite, and Filippo Fuoco, an Italian miner and enthusiastic member of the local Miners' Union, one of the dynamiters, was fatally injured by the explosion, dying shortly afterwards. His companions escaped. The transformer building took fire, and was consumed. Fourteen officers and members of the Executive Committee of the local Miners' Union were at once arrested and placed in jail in Idaho Springs. This is the second attempt in a short time to dynamite the buildings of the Sun & Moon. About a year ago a union was organized at Idaho Springs, affiliated with the Western Federation of Miners. Because of the local demand for miners, a considerable number of outsiders drifted in from the San Juan, the Coeur d'Alenes, Butte and other union districts, and these newcomers constituted the bulk of the membership of 100 of the Idaho Springs Miners' Union. The Sun & Moon Mine was closed February 1, by a strike of the union miners. Manager Sims refused to grant the men's demands or to recognize the union, and early in June succeeded in partly re-opening the mine with non-union miners. Work on a large scale was not attempted, however, until July 1, when the force was increased, followed by the first attempt to damage the property. When the Sun & Moon closed in February, it was the largest producer in the Idaho Springs District, having been shipping from 2,000 to 2,500 tons a month, and giving employment to 150 men.

On July 29, after an indignation meeting of the citizens of Idaho Springs, in which Mr. Lafe Hanchett, president of the First National Bank and manager of the Lamartine Mine and the Newhouse Tunnel, designated the Western Federation of Miners as the "Western Federation of Dynamiters and Murderers," and said that he and Manager Sims of the Sun & Moon had been marked for the past four months to share the same fate which befell Manager Arthur Collins of the Smuggler-Union Mine at Telluride, the 14 imprisoned members of the union were taken out, escorted by 500 citizens, representing at least 80 per cent of the business interests of the community, to the Eastern limits of the city and warned never to return. Earlier in the evening, William Bates, ex-President of the local miners' union and two Italians, prominent members, suspected accomplices of Fuoco, were taken from the Idaho Springs jail to Georgetown to avoid possible violence against them. Fuoco, the dynamiter killed, lived at the home of J. F. Chandler, the financial secretary of the miners' union, and was the interpreter in addresses to the Italian and Austrian miners in the district. Chandler disappeared a few days before the dynamiting. The Citizens' Alliance of Idaho Springs has officially announced that it will reimburse the owners of the Sun & Moon Mine for the loss entailed by the explosion, estimated at between $2,500 and $3,000. The mine is owned in Cleveland and New York City. W. J. White is president, and other directors are G. G. Sowden, Charles S. Britton and John U. May, of Cleveland, and C. A. Wimpfheimer, Nathan Westheimer, and others of New York City.

On July 30, H. E. Gregory, a member of the Georgetown Miners' Union, alleged to have made threats to blow up the dam of the company that furnishes electrical power to the Sun & Moon Mine, was arrested at Georgetown. He was in possession of correspondence from Chandler, in which the latter is alleged to have said that the union could easily bring about the suspension of work at the Sun & Moon Mine by destroying the electrical power plant. Other evidence tending to show that the union leaders were cognizant of the dynamite plots is said to have been found.

At Idaho Springs the City Marshal and Sheriffs met every train on July 30 to prevent President Moyer of the Western Federation of Miners or any other union leader getting off. Several miners, who have discussed objectionally the dynamiting, have been ordered to leave Idaho Springs, and have promised to obey.

San Francisco. July 30.

(From Our Special Correspondent.)

In early days in California the bars along the American River were extensively worked, but some were mined in a slipshod manner and there are many locations which carry much gold in bedrock crevices. The North Fork Ditch Company is considering a plan to enlarge its canal to drain the river during the summer months. All the river mines from Auburn to Folsom would be greatly benefited, as they could get at the gold deposits without having to build individual dams, etc., for each claim, and a vast amount of work could be done.

The new 120-stamp mill at the Royal Consolidated Mine, at Hodson, is the largest individual mill in the State. J. C. Kemp Van Ee is manager. The ledge of the mine is wide but low grade. In the mill the rock breakers, instead of being at the top, are at the shaft close to the ground. The ore is dumped into a hopper and fed to a No. 7½ Gates crusher with a capacity of 100 tons an hour to a 2½-in. ring. It is then elevated and passed through a trommel 16 ft. long and 48 in. diameter, with 1-in. perforations; what fails to pass, about 40 per cent, is delivered to two No. 4 Gates crushers, crushing to ¾ in. ring. The crushed ore is carried to the mill over an electric tramway 1,414 ft. long and is dumped into large bins. The mill building is 140 by 209 ft. The stamps are arranged with 60 stamps standing back to back, and each unit of 20 stamps is driven by a separate 50-h.p. motor and each unit is again divided so that each 5-stamp battery is run by a separate cam shaft. The stamps weigh 1,050 lbs. each, and drop 5 in. 106 times a minute. The mortars weigh 8,000 lbs. each, and are laid on concrete pillow blocks. This mill is owned by the Royal Consolidated Mines (California) Company, Limited, with head office at Finsbury House, Bloomfield street, London.

New York men have taken hold of the old Gold Canyon Mine on the north side of the Middle Yuba River, about six miles from Moore's Flat, Nevada County, and a long tunnel will be run. The mine was a producer 40 years ago, but it has been idle some time. The Gold Canyon District has a good record. Only one lodge has been worked in the Gold Canyon, but the new owners think the ground contains a second one, and are going to try to find it.

The Pacific Smelting Company is about to put up a smelting plant near Bakersfield, and announces that there will be two 50-ton furnaces. It expects to get much of its ore supply from Kern County camps, and have the miners save freight charges to San Francisco Bay.

The decision of Director Walcott, of the United States Geological Survey, to continue certain geological work in the California oil fields is received with pleasure by the oil men, as many mistakes have been made by inexperienced men. In some of the upper counties hundreds of thousands of dollars have been expended without economic results or profit, and even in the recognized oil belts much money has been wasted. Knowledge of the exact condition in the Coast Range mountains is very slight. Only this week the last of the Shasta County wells was closed down by attachment, putting an effectual stop to the oil industry of that section. In Contra Costa, Alameda, Marin and some other bay counties wells are being sunk, but no oil of any moment has been found. Over on the coast side of San Mateo and Santa Clara counties conditions are the same.

The Garden Valley Gold Mining Company, of Siskiyou County, has been fined about $1,500 for cutting timber on a forest reserve. The damages were awarded to the Government by the United States District Court.

In Southern California, where numbers of people have lately gone into mining for the first time, wonderful (?) discoveries continue. Thus Los Angeles papers announce from Whitewater Canyon, San Bernardino County, that five prospectors, who noticed a mountain of peculiar color, on investigating, with the aid of an assayer, found it to be "a mountain of nitric acid, sulphuric acid, lime, potassium, gypsum and silica." Nothing is said of putting on a faucet to tap it. The prospectors were hunting for gold, but think, after the assayer's report, they have something better. The item keeps on the rounds of the southern press, as indicating the natural resources of the region.

In Penn Valley, along Squirrel Creek, about 10 miles from Nevada City, arrangements are being made to do some dredging, as preliminary tests have been satisfactory. The gravel is about 25 ft. deep. S. M. Cheyney and W. A. Palmer, interested in dredging elsewhere, have bought 140 acres. The land has been used for farming. Along the Yuba River, near Maryville, ground is rapidly being bonded for dredging. Many residents of San Francisco are making investments. As soon as the dredger can be built work will begin on the O'Brien tract, and prospecting is going on in Dobbin's Ranch district, in the valley near Indiana Ranch, in Slate Range Township, near Camptonville, and in other places. The section will soon be second to Oroville.

At the first meeting of the Desert Mine Operators' Association, in Los Angeles, 40 odd companies sent in applications for membership, indicating considerable interest. Among those which have joined are the Yellow Aster, of Randsburg; Stanford and St. Elmo, of Johannesburg; Bagdad and Chase mines, in Bagdad District, San Bernardino County; Exposed Treasure, and others of Mohave District, Kern County; the mines of Virginia Dale District and other Southern California properties. From Arizona, the Arizona Wallapi Mining Company of Chloride and Gold Road and Leland of Mohave. From Nevada the Nevada Keystone and Nevada, of Yellow Pine, and all the companies of Searchlight District. The Executive Committee consists of John Singleton, of the Yellow Aster (president); F. J. Harrington, of the Quartette Company at Searchlight (vice-president); Frank J. Hicks (secretary); G. H. Hooper, John Seward, E. H. Stagg and Julian P. Jones. Since the Randsberg strike miners in other desert regions have threatened to tie up properties from "sympathy," and the association will endeavor to prevent the spread of labor troubles.

Travel this season in Kern, San Bernardino, Riverside and some other southern counties is unusually heavy. As a consequence many of the water places are taxed to their limit and something will soon have have to be done to provide water for miners, prospectors and travelers. The Chamber of Commerce of Los Angeles recently recommended the supervisors of the different southern counties to look after the water holes, springs, etc., in their respective districts so as to conserve and increase the water supply. A more complete system of sign posts is also needed.

The sprinkling of rural highways with California heavy oil is quite rapidly increasing and is giving excellent results, making them free from dust and much harder surfaced, so that teaming is easier. Within the past few weeks 50 miles of roads in Santa Clara County have been sprinkled with oil.

A tract of land, about 12 townships in size, has been withdrawn in the Susanville land district temporarily to give time for examination to see whether it shall be included in the Warner Mountains forest reserve.

Victoria, B. C. July 27.

(From Our Special Correspondent.)

As a result of the recently offered Government bounty on lead, operations have been resumed or preparations made for active work on a number of Slocan and Kootenay properties, which for a year or more have been idle. The manager of the Sullivan Mine, in Fort Steele District, is to ship 1,000 tons of ore, while the St. Eugene at Moyic, the largest lead mine in Canada, is to be re-opened before long. In the Slocan work is resumed at the Jackson & Last Chance; tenders are being called for driving a 1,600 ft. tunnel on the Antoine; the working force at the Wakefield is being increased and the concentrator enlarged and remodeled. There is meanwhile talk of establishing another smelter and a refinery, at some convenient centre.

The new finds on Poplar Creek continue to attract attention, and there can be no doubt that the area is mineralized. It is to be hoped that the Department of Mines will arrange to have the Prov-

incial Mineralogist or other responsible authority investigate the district. The known rich area extends from Cascade Creek to Rapid Creek, about seven miles, crossing Poplar Creek. At Poplar Creek itself the values chiefly occur as free gold.

At Hedley City, in the Similkameen, construction work on the Nickel Plate flume and stamp mill is proceeding, and it is stated that upon the completion of the mill work on a smelter in the neighborhood will start. Lately a large electrical plant was ordered, and the outlay on the property to date is a considerable sum.

The outlook in the Boundary improves, although a shortage of coke is again interfering with smelter operations at Boundary Falls. Preparations are well in hand for the installation of a third furnace, for which all the machinery has arrived. Among others the Snowshoe Mine at Phoenix, the British Columbia Company at Greenwood, and, it is believed, the Sunset Smelter at Boundary Falls, have either begun to use electric power or propose to do so immediately. At some of the big mines, steam power is growing costly, as timber becomes scarcer, and it is only a matter of time when all the larger properties will operate their plants by electricity. In the granite belt near Greenwood, the E. P. U. claim has got net returns on a carload shipment of $2,211, or at the rate of $110 per ton.

At Nelson, ore of good grade has been found in No. 4 tunnel of the Venus, at a depth of approximately 600 ft. The Venus is amalgamated with the Athabasca, upon which work has been resumed.

In consequence of the reported discovery of a very rich new gold area on a tributary of the Alsek River, in the Yukon, a stampede has taken place from White Horse, from which place the new finds are 120 to 150 miles distant northwesterly. In one day over 150 licenses were taken out, and excitement ran high. Two creeks, Fourth of July and Ruby, have been already tolerably well prospected for about 10 miles, and it is said the gold is very evenly distributed, and that miners are making from $10 to $12 a day.

It is announced that arrangements have been made for the re-opening of the Great Western Mine, at Rossland, one of the properties purchased by the British American Corporation some four years ago.

Great gratification is locally expressed at the satisfactory showing made by the Tyee Mine, at Mount Sicker, during the past year, as set out in the report of the annual general meeting recently held in London.

Meetings of the Great Western Mines, Limited, and the Double Eagle Company, of Ferguson in the Lardeau, were held last week, the manager of the Great Western reporting that since November last necessary machinery has been installed, and 3,391 ft. of development work were done. Fourteen hundred tons of ore were shipped, realizing $76,915, the net value being $40,224. An aerial tramway is to be shortly built to convey the second class ore on the dump to a concentrator at Ferguson.

A Slocan City correspondent writes to me as follows: "Winter and spring developments in this division have resulted in several important discoveries of rich ore, and lessors of claims on the smaller lines of veins have been generally very successful. On Ten Mile Creek, the Enterprise Mine has been steadily and profitably worked under lease, while the owners of the Highland Light have opened up a body of $1,000 ore, and hope to establish some record shipments. The Westmount and the Victor are also yielding profits. The latest reported strike is on the Black Hawk, which now shows the typical ruby silver of that part of the district. On Springer Creek development has been fairly steadily maintained, and has resulted in proving the continuance at depth of large deposits of low grade ore at the Black Prince. The last carload of ore shipped from the Republic was the highest grade of the season, and the Meteor and Dayton, both under lease, have shipped ore averaging $250 per ton. Lemon Creek has been more active than for years past, and several properties near the head waters are showing up exceedingly well. To sum up the district as a whole is busy, some mistakes are being rectified, the narrow rich veins are being more carefully mined, while the large deposits are being systematically explored."

London. July 25.

(From Our Special Correspondent.)

The De Lamar Company, operating the once-famous De Lamar Mine in Owyhee County, Idaho, continues to make profits by working the old stopes and fillings. It will be remembered that when the mine showed signs of exhaustion two years ago, the company was reconstructed, with a capital of £80,000, just one-fifth of the former capital, in order to make the nominal capital more proportionate to the actual value of the property. The old company distributed £500,000 in dividends, so that the original shareholders received 25s. back for every pound invested, and they also received shares in the new company at the rate of 4s. per old share. Since the reconstruction dividends, amounting in all to 45 per cent. on the present capital, have been paid. During the year ended March 31 a total of 33,776 dry tons were treated, yielding 13,180 oz. of fine gold and 33,578 of fine silver, bringing in $287,160. The prospecting at various points of the workings has not discovered ore of great value, but at several points ore of the average that is now being treated is still being opened up. Negotiations are in progress for the acquisition of other properties, but so far nothing has been purchased, though many properties have been examined and some of them developed. The company has in hand £62,000 of unpaid capital, besides £13,000 balance from revenue account, so that it ought to be able to secure a suitable property eventually.

Last week I gave details of the new scheme of the Nile Valley Company, that pleases directors, Mr. J. B. Robinson and the Egyptian Government, whereby the shareholders get four shares in the new company for every one in the old. The present company subscribes for £20,000 in new shares at par, and Mr. Robinson subscribes for a similar amount on the same terms, with an option on 47,000 remaining shares at 30s. each. This proposition was brought forward by Mr. Robinson, and the directors rightly came to terms with him at once, without waiting for a meeting of shareholders. This meeting has since been held for the purpose of ratifying the agreement. It was thought in some quarters, and openly stated in financial papers, that the deal was far too much in Mr. Robinson's favor, and that shareholders would refuse to adopt it. Better counsels have prevailed, however, and at the meeting there was only one dissentient. There is one point in connection with the scheme which does not appear to be quite clear and may eventually lead to some friction with the Egyptian Government. This is the clause which gives Mr. Robinson the option on 47,000 shares at 30s. Such options are usually granted for the purpose of giving the supporters of a company a deferred profit. When a company shows handsome results the shares advance rapidly in price, and in the present case it is conceivable that the quotation might get up to several pounds a share. This is the opportunity the option gives, of selling the shares, on which the individual holds the option, at market price, and so reaping a considerable profit without any risk. Such a proceeding would presumably be quite contrary to the terms and conditions laid down by the Egyptian Government, for the government expressly stipulates that the shares shall not be used for stock exchange purposes, and that all the money subscribed for shares shall go to working capital. It may be that some private understanding has been come to with regard to the negotiation of shares acquired this way; but in any case we may hear something on the point from the Egyptian Government.

The Playa de Oro placer mines in Ecuador have turned up once more in London. Readers may recollect that when the mines were floated in New York, between 10 and 11 years ago, it became necessary for the JOURNAL to draw attention to the many exaggerations in the prospectus. For three years the company made no headway, and then the directorate and management were removed. At the same time treasury stock was introduced in London, and a considerable amount of new capital was thus raised. With this money and also by means of loans secured by mortgage one of the chief drawbacks of the original scheme has been removed, that is, a supply of water for hydraulicking has been provided. The expense must have been very great, for there are four miles of open canal, much of it in deep cuttings; over a mile of tunnel and nearly a mile of flume. After this work was completed funds once more ran short. Interest could not be paid on the mortgage debentures, let alone any redemption effected. At this juncture it was thought best by the English shareholders and bondholders to remove the control to England, so a new company has been formed, called the Playa de Oro Company, Limited, with a capital of £400,000. Of this capital £200,000 is to be distributed to the shareholders in the American company in satisfaction of the original capital of $10,000,000, which is really very liberal, as the average price of issue of the American shares was a long way below par. The mortgage debt of $2,000,000 is to be satisfied by the issue of similar debentures by the new company. There is to be a further issue of shares and debentures in order to provide working capital, but the issue can hardly be a public one, as there is no independent report on the property. The same reason makes it out of place here to pass a judgment on the scheme or to recapitulate the vague description of the property that has been published by the board of directors. I ought to state, however, that the English bondholders belong to many important business firms, such as the Cunards, the Coates, Johnson, Mathey & Co. and the Sandermans; so it is presumed that they know what they are about. The company may have some trouble before it, as a lawsuit has been brought against the directors of the American company, alleging that at the time of the foreclosure by the bondholders there had been produced large amounts of gold and platinum. This allegation I do not believe, but there is more internal history of the present removal of the company from America to England than will see the light of day.

The adjourned meeting of shareholders of Stratton's Independence took place this week. When the meeting was held a month ago shareholders were quite against the proposition of the directors to carry forward the whole of the available balance, some £140,000. In the meantime the directors have decided to distribute a 5 per cent. dividend, and their proposition was accepted by the shareholders at the adjourned meeting, although much dissatisfaction was expressed that it was not 10 per cent. The directors had nothing to announce about the acquisition of a new mine, nor did they give the much-desired explanation of the fact that the mine is still shipping after its life had been supposed to be terminated a year ago. Altogether the relations between shareholders and directors are not of the pleasantest. The directors do not take the shareholders into their confidence, but apparently regard them as their natural enemies.

Sydney, N. S. W. June 23.

(From Our Special Correspondent.)

Queensland.—The gold yield for May was 89,112 oz., as compared with 77,964 oz. for May, 1902. The chief producers were: Charters Towers, 40,232 oz.; Gympie, 23,489 oz.; Mount Morgan, 10,773 oz.; Croydon, 5,706 oz.; Ravenswood, 4,704 oz. At no previous time has there been a greater number of assured profit-making mines, nor has there been a greater proportion of existing companies possessing such favorable possibilities. At Gympie, the South Glanmire & Monkton has cut the big formation that the No. 2 South Great Eastern has done so well on; the formation is 70 to 90 ft. wide, and 120 to 140 deep, and the company has 770 ft. along the line, averaging over 1 oz. per ton. It is increasing its steam power and erecting a new air compressor and rock breaking plant, to handle 600 tons per week instead of 400 tons as now.

New South Wales.—The furnace of the Great Australian quicksilver mine on the Upper Clarence River is now in full operation. A new opal field has been discovered about 50 miles out from Walget. It is said to be 20 miles long and 3 or 4 miles broad. At present operations are only on the surface.

Victoria.—A party of miners near Tarnagulla have found a nugget of gold weighing 118 oz. There has been a revival of interest in the Waanyarra rush. A new rush has broken out near Irvine's Reef, about 2½ miles east of Tarnagulla, close to the London River. The prospectors got a 4 oz. nugget and 15 dwt. of fine gold from the bottom of their shaft. Claims have been pegged out for half a mile along the supposed line of wash, and there are about 100 men on the ground.

The New Chum Railway, Bendigo, has struck free gold at the greatest depth at which it has yet been found in Australia. In the shaft, now down 3,855 ft., a slide coming in has been cut, above and below which are threads of quartz in which a few colors of gold have been seen. The tributors working a block of ground in the bottom level, are putting through a crushing that is expected to yield satisfactorily. The stone is about 4 ft. thick.

The Long Tunnel Extended Company, Walhalla, has paid its 228th dividend of 6s. per share. The Madame Berry West has won gold to the value of £16,300 during the six months ending May 6. The total value of gold obtained from this mine to date is £440,000, and during the past half year dividends of an aggregate value of 4s. 6d. per share have been paid. The Berry Consols Extended has raised gold of the value of £31,147 during the past half year, and paid in dividends 4s. per share. Its prospects are regarded as better than at any stage yet.

Perth, W. A. June 22.

(From Our Special Correspondent.)

Kalgoorlie.—The striking of the famous Horseshoe-Boulder Boundary lode in Great Boulder ground is announced. It is a severe blow for the Horseshoe Mine, which has so long been drawing the richest ore from this lode. At the 900-ft. level the lode was only 19 feet from the Boulder ground, and was struck in the Boulder at 1,000 feet. The tenth and eleventh levels are being extended south to permit of locating the lode by bore holes. Another series of drill holes will be put in from the twelfth level at the south end of the property. The acquisition of this lode gives the Great Boulder eight feet of rich ore, traversing the property for over 1,000 feet.

The Lake View Consols reports the discovery below the 1,050-ft. level of ore worth 3 to 15 dwts. per ton, and 3½ feet wide. The North Kalgurli is making rapid progress on its new battery, which is expected to start shortly.

Kalgoorlie gold productions included in the May yield were the following:

Mine.	Tons.	Ounces.
Golden Horseshoe	13,037	17,574
Great Boulder Perseverance	11,348	17,557
Great Boulder	9,300	14,308
Ivanhoe	12,686	10,950
Oroya-Brownhill	4,053	8,040
Associated	4,809	6,020
Associated Northern	1,036	6,549
Kalgurli	4,031	3,878
Great Boulder Main Reef	1,602	1,221

Davyhurst.—This district, north of Kalgoorlie, is steadily going ahead. Several mines look exceedingly well, especially the Golden Pole and Westralian Waihi.

The vertieal shaft at Merton's Reward is down 340 ft.; the underlay shaft is down 420 ft., the ore keeping up good grade. The new air compressor works well. The management intends to get well ahead with development before again starting the battery.

At Leonora the Sons of Gwalia is looking well. A 25s. interim dividend is announced.

The Westralia-Mount Morgan's output for May was 6,010 tons for a yield of 4,505 oz. 17 dwts. The mine is looking exceedingly well. The lode at the 300-ft. level averages 25 ft. for a length of 700 ft., while one portion is about 100 ft. wide. The Millionaire, a mine south of and practically owned by the Westralia Mount Morgan Company, is rapidly approaching the paying stage. In spite of the development work carried out, the Millionaire contains so many lodes that there still remains a lot of work to be done at the 100-ft. level toward the west. Other development all along the range of hills on the line of lode are satisfactory and give promise. The present small battery (5 head) on the Millionaire is doing good work—above 30 tons per 24 hours—the last returns being 494 tons for a yield of 212 1-5 oz., valued at £3 15s. ($18.15) per oz.

Work on the railway from Malcolm (the present terminus) to Morgan and Laverton has begun, and the road should be ready in a very few months, bringing these districts within a few hours' journey of Kalgoorlie.

Murchison Field.—The Great Fingall yield for May was a record. The mine is looking better than ever, and fully justifies Mr. A. H. Curle's recommending this mine as an "investment." The machinery is all of the latest description, and arranged to work at lowest cost. The success of this mine has helped bring other capitalists to this field, some leading South African magnates being interested in exploration work in this district.

Northwest Districts.—The Government is sending geologists to report on the prospects of the Tilbarra gold fields, and advise as to construction of the long-required railway. It is not understood the Government will not do this work, but is open to receive tenders from private capitalists. It is generally expected that Mr. A. G. Morgans will undertake it. Mining men are visiting the fields to secure options before the rush to it, and present high prices of copper and tin are attracting attention to many promising formations, at present unworked, owing to the expenses of mining and transportation.

Greenbushes Tin Field.—A parcel of 100 loads has been treated at the smelter for a return of 2 tons 7 cwt. of tin. The sluicing plant to carry water to the field will soon be completed.

Auckland, N. Z. July 8.

(*From Our Special Correspondent.*)

Gold Exports.—During June the Colony exported 64,075 crude oz. of gold, valued at £240,834 ($1,204,170). The export for the half year is 257,097 crude oz., of a value of £977,822 ($4,889,110), an increase of £87,376 over the corresponding 1902 period.

The exports of gold and silver from the colony in May, and the five months ending May 31, are reported by the Mines Department as below, in ounces:

	Gold.		Silver.	
	1902.	1903.	1902.	1903.
May	48,157	45,521	95,110	65,739
Five months	189,936	193,122	280,339	214,373

The increase in gold for the five months this year was 3,186 oz.; the decrease in silver was 65,966 oz. The bullion reported this year was equal to 173,521 oz. fine gold, or $3,586,675.

Gold Dredging.—During the past few months the Otago dredges have been doing fairly well, but owing to heavy rains the rivers have kept somewhat high, and few large yields are reported. The Hartley & Riley, the Electric Company's dredges, and several others have had good returns, running from 150 to 200 oz. for the week. During June the published returns of the Otago dredges totaled 8,653 oz., obtained by some 70 to 80 dredges. During the same period the dredges on the West Coast won 2,111 oz., obtained by about 25 dredges. Although not more than 100 dredges regularly report their yields, there are probably over 200 dredges on the various fields. Some of these are privately owned and do not report returns, others obtain so little gold that their production is seldom made known, and a considerable number are out of commission. When allowance is made for those dredges which do not pay their way, or are idle, it must be admitted that gold dredging in New Zealand is not quite so profitable a business as it is sometimes made out to be, yet on the whole the returns are dividend-paying, and the dredges give direct employment to at least 2,000 men, and indirectly to nearly as many more.

Cinnabar Mining.—After a long period of apparent inaction, the prospects of the Waitahuna cinnabar mine (Otago), are encouraging. A considerable amount of prospecting has been done, with satisfactory results. A level has been run from the side of the hill, cutting the lode cut at a depth of 190 ft. below the outcrop. The lode is here of good size, and the ore is stated to carry good values.

Copper Mining.—A find of rich copper ore is reported from the Ruahine Ranges (Hawkes Bay). One lode is stated to be from 20 to 30 ft. thick, and to carry first class ore, but these statements require confirmation. Previous discoveries of copper ore in the same neighborhood have not led to commercial results, the ore being usually a very lean sulphide. Another attempt is being made to turn to account the copper deposits in Aniseed Valley, Nelson, where a large lode exists, which was worked many years ago. In other parts of Nelson, notably D'Urville Island, at Waipori in Otago, at Maharahara in Hawkes Bay, in Great Barrier and Kawau Islands, at Whangaroa and other places in the north of Auckland, and in several localities in the Hauraki gold field there are lodes carrying copper, in what ought to be paying quantities. Years ago copper mines were working in several of the places mentioned, but all have been abandoned; probably in no case were the operations directed by competent engineers.

GENERAL MINING NEWS.

The record for the Pennsylvania and Lima oil fields for July shows 1,546 wells completed, 15,332 bbls. new production and 266 dry holes, says the Oil City *Derrick*. This is a decrease from June of 103 wells completed, 2,557 bbls. production and 33 dry holes. On the last of July 668 rigs and 1,470 wells drilling were in progress in the Eastern and Western oil fields. These figures are the high water mark of oil developments. The increase over June was 54 rigs and 51 wells drilling, a total of 105.

ARIZONA.

COCHISE COUNTY.

(*From Our Special Correspondent.*)

Lowell.—The old shaft in this mine, near Bisbee, is being straightened preparatory to resuming sinking.

GILA COUNTY.

(*From Our Special Correspondent.*)

Oxbow.—J. B. Newman has bought for $5,000 a one-third interest in this and 4 other patented claims at Payson. A 10-stamp mill, which has been idle for some time, is being overhauled.

MOHAVE COUNTY.

Gray Eagle Group.—S. G. Thompson, owner of this group of 6 gold claims at Hardyville, on the Colorado River, is at San Francisco for the purpose of organizing a company to work the property.

Lucky Boy.—This mine, at Chloride, is reported producing ore from the 400 ft. level, running 5 oz. gold and 90 oz. silver. Cross-cutting is being done on the 500-ft. level. The erection of a mill is contemplated.

Mary McKinney Mining Company.—This company has not resumed work, but is expected to shortly. A Crane ore-washer is being installed. The property closed down about two weeks ago for repairs.

Monmouth Development Company.—Dr. J. P. Wallace is operating mines for this company on Burro Creek. A reduction plant is to be erected.

Oro Plata.—In the breasts of the 180 and 280 ft. levels of this mine, in Todd Basin, high grade ore is reported. Most of the ore is shipped without dressing. Air drills have been installed.

Pilgrim.—This property nine miles west of Chloride, belonging to Dempsey & O'Dea, was conditionally sold this week to a company composed of Los Angeles and eastern men. The new company is to sink three 100-ft. shafts at once.

Portales de Oro.—Nelson E. Walcott, president of the company owning this and other mines at Union Pass, is surveying the claims preparatory to applying for a patent.

Sunrise.—J. S. Waddey and Claud Richardson have a contract to sink the 140 ft. shaft on this mine at Chloride 100 ft. deeper.

SANTA CRUZ COUNTY.

Eagle Group.—Los Angeles men have bought this group, in Oro Blanco District.

Twilight.—This property has been bought by Houghton, Mich., and Chicago men.

(*From Our Special Correspondent.*)

Arizona Gold and Copper Mining Company.—This company has its new 50-ton mill in operation at Patagonia. The ores carry gold, copper and silver.

YAVAPAI COUNTY.

Judge E. R. Sloan, upon the application of 15 different mining companies, recently granted an injunction against the Yavapai district union of the Western Federation of Miners, the McCabe, Walker and Groom Creek miners' unions and Hugh Burns and F. P. Starr, walking delegates, restraining them from interfering with the peaceful operation of the respective companies' properties.

(*From Our Special Correspondent.*)

Black Warrior Copper Company, Amalgamated.—All work has stopped at the mine, near Bisbee, under instructions from the Philadelphia office of E. H. Benson, the superintendent. The reason given is that the present matting furnace will not handle the ore and the precipitate from the leacher. The company is to install a 60-ton water jacket furnace.

Yager Canyon Copper Company.—Two 80 h. p. boilers for this company's mines have arrived at Yager. A 10-drill air compressor has been ordered. Work is progressing on the mill building.

YUMA COUNTY.

(*From Our Special Correspondent.*)

Bullard.—This gold property, at Cunningham Pass, has been handed by R. W. Bullard, the owner, to Wells H. Bates. The property consists of 5 claims. Two shafts have gone below water level at 200 ft.

CALIFORNIA.

BUTTE COUNTY.

Consolidated Golden Trout Mining Company.—A foreclosure suit against certain property of this company is being tried at Oroville. The amount includes various labor liens assigned to Mr. Greely.

Farnham Mill.—E. P. Farnham is to put up a small mill on the Henry Berry farm, where McCall found such rich quartz recently.

Magalia Ridge.—A number of mines in this locality are giving good returns. At the Stauffer, near Nimshew, 20 men are at work. The John Dick employs 30 men and is drifting good ground. At the Indian Spring 20 men are at work. The Madison, a new quartz enterprise, has 10 men. Work will soon begin on the Alice.

Spring Valley.—This mine, 4 miles from Cherokee, is now being developed by the United Gold and Copper Company, of Chicago.

CALAVERAS COUNTY.

Cordelia.—W. L. Grider, superintendent of the Gum Boot Mine, has acquired an interest in this property at Murphys and further prospecting is to be done at once.

Forty-Nine.—At this placer mine, at Douglas Flat, J. M. Evans, superintendent, the shaft is down 150 ft. and a station for the level has been cut. Eastern men are opening this gravel channel.

Lloyd Gravel.—Lumber and tools have been taken to this mine and work has begun. Cash payments have been made on the mine.

Woodhouse.—For this mine, at West Point, J. A. Summers, superintendent, heavier machinery has been ordered to handle the water.

FRESNO COUNTY.

Last Chance.—W. S. Jones and F. G. Kennell have found near Sampson Flat the ledge that others were unable to locate some years ago.

INYO COUNTY.

Bishop Park Region.—In this district near the upper waters of Bishop Creek, south and west of Bishop, there is considerable excitement and numbers of miners have gone there. The ledges are quite large. The Rocky Point, discovered by Chas. Coyle and H. N. Stovall, is the principal claim thus far. Many locations have been made recently. In earlier years there was some surface mining done in the vicinity.

KERN COUNTY.

Miners' Strike.—The Randsburg Miners' Union has sent out the following notice: "A strike has been declared against all mines under the jurisdiction of the Randsburg Miners' Union No. 44, Western Federation of Miners. The issue involved is a 50c. per day advance in wages. Our union has voted unanimously to uphold this principle." The strikers are orderly and there has been no overt act.

Butte Lode.—This mine remains idle.

Consolidated Butte Mines Company.—The new hoisting plant of this property at Randsburg, is completed, but the mines remain closed.

Iron Ore.—Kern County people developing an iron ore property near San Emedia expect to dispose of it

to Eastern men. There is a very extensive deposit, according to W. H. Hill, of Bakersfield.

Pyramid.—At this mine, at Randsburg, Charles Wores is sinking a double compartment shaft.

Yellow Aster.—No attempt is being made by the management to open the property at Randsburg. The machinery is in shape for a long shut-down.

MARIPOSA COUNTY.

Exchequer Mining Company.—This company is opening the O'Brien claims on the Merced River and working 15 men. A tunnel is being driven to connect with a shaft.

MENDOCINO COUNTY.

Campbell.—J. B. Campbell is opening a mine on his ranch at Willits. The ledge is quite wide and carries gold and silver.

MONO COUNTY.

Golden Gate.—Brown & Donovan, owners, have again come into possession of this mine, at Coleville. the Wedekind Mining Company having decided not to pay the $16,000. The latter company is reported as being defendant in a number of suits for wages.

MONTEREY COUNTY.

Gold Ridge District.—Free gold ore has been found in the Gold Ridge Nugget claim of the Grey Eagle Company, while doing assessment work. This lode is supposed to be the source of the placer gold found in Spruce Creek. A strike at the Melville Mine was made right at a point where people have been passing for years.

NEVADA COUNTY.

East Orleans.—Ore from this mine at Grass Valley, G. W. Baldwin, superintendent, netted $40 per ton at the mill and some shipped to the smelter yielded $300 per ton.

Eddy.—The patent 3-stamp mill of this mine, near Nevada City, W. W. Kirkham, superintendent, has started. Good ore is taken from the claim.

Gold Canyon.—This mine, on the Middle Yuba River, a few miles from Moore's Flat, has been bought by F. B. Hill for New York men. The mine was first opened some 40 years ago, and first and last is supposed to have yielded about $250,000. There was a 10-stamp mill on the property while owned by the late D. R. McKillican. A tunnel is to be run, a shaft started, and by winter a plant will be put in.

Grass Valley Consolidated.—Geo. W. Root, superintendent of this property, has paid the employees part of the money due them. Work is suspended at the mine, and the men discharged, but the pumps are busy. The future of the property is in doubt.

New England.—This mine on the old Grass Valley road will probably be reopened by W. C. Walrath and others. The mine is now known as the Thomas.

Penn Valley.—The ground in this valley is to be prospected for dredging.

PLACER COUNTY.

Eureka and June Bug.—Operations have been resumed on these mines at Ophir, between Auburn and Newcastle. The ledges are small, but quite rich.

Southern Cross.—The International Mining and Securities Company is working this mine at Humbug Canyon, under the supervision of E. J. Trimble. A 20-stamp mill is to be erected.

PLUMAS COUNTY.

Claybank Tunnel.—This tunnel at La Porte is now in 7,000 ft., the work having mainly been done at the expense of John Thomas. The face of the tunnel is not far from the famous "blue lead," upon which there are other claims which have produced largely.

North Canyon.—This property in North Canyon near Greenville embraces the Johnny Bull group, including the Phoenix Mine. The group is bonded to Droege Bros., of Covington, Ky., and F. W. Day. There is a 5-stamp mill and cyanide plant on the property.

Plumas Gold Mining Company, Limited.—This property near Greenville, adjoining the Johnny Bull group, is being developed by tunnels. Grading is being done for a 15-stamp mill and five concentrators. Electricity will be used for power and light. The new air compressor will run six Rix drills. Water for power will be taken from the Round Valley reservoir.

SACRAMENTO COUNTY.

Consolidated El Dorado Gravel Mining Company.—It is not true, as was rumored, that this company, better known as the Blue Ravine, has been attached for a debt for timbers. The company has a good mine, which has been paying for some years.

SAN BERNARDINO COUNTY.

Bagdad.—These mines at Stagg have just obtained a number of skilled miners from Grass Valley. The foreman, J. A. Brockington, is a Grass Valley man.

SAN DIEGO COUNTY.

John S. Dunn, of Los Angeles, has bought partly developed copper mines in Defiance District, in the northern part of the county, and is to develop them.

Noble.—Operations are active at this mine at Descanso, J. A. Wauchope, manager. It is a large low-grade proposition, the ore carrying some tellurium.

Stonewall.—In reopening this old quartz mine at Cuyamaca, a few miles from Julian, some trouble is caused by a scarcity of teams.

SHASTA COUNTY.

Balaklala.—Grant Snyder is now superintendent for the Balaklala Consolidated Copper Company, mainly owned by Peter Kimberley, C. A. Malm, S. Weil and W. F. Snyder. The power line to the mine will soon be completed.

Inca Treasure Gold Mining Company.—This company near Delta is shipping $20 to $25 ore to the Keswick smelters. Options have been secured on a number of claims in the vicinity of late. W. W. Hooper is superintendent.

SISKIYOU COUNTY.

Ball.—This mine, near Rollin, owned by the Yreka Mill and Mining Company, has closed for lack of water power.

Cherry Hill.—This company, W. H. Turner, superintendent, has decided to resume work with a full force.

Mount Vernon.—This mine on Cherry Creek, near Yreka, has 10 men taking out ore. Vernon Grey is superintendent.

Pine Grove.—Whitney & Co. expect to start work again on this claim near the Quigley ranch, on the Klemath River, and will use a hydraulic elevator.

Punch Creek.—This mine near Yrea Yreka, under bond to G. W. Grayson, of San Francisco, and owned by Alex. Rosborough, H. R. Haynes and Churchill Bros., is improving with development.

Siskiyou Development Company.—This company is sinking a shaft on the Herr ranch, near Ager, to strike the coal bed developed on the side of the hill.

SONOMA COUNTY.

Cloverdale.—C. B. and H. Lawley, owners of this claim, intend putting up a 40-ton furnace.

Culver-Baer.—This quicksilver mine at Pine Flat is a steady producer.

Socrates.—This quicksilver property at Pine Flat is again producing.

Sonoma Consolidated Company.—This company is burning brick for the new quicksilver furnaces at Pine Flat.

TUOLUMNE COUNTY.

Black Oak Mining Company.—A good shoot of ore has been struck in the 1,300 level 400 ft. south of the shaft in this mine at Soulsbyville. W. G. Scott, superintendent. The grade of the ore is high.

Clio.—This mine at Jacksonville is closed for the present and Superintendent A. P. Chittenden has gone to Denver to consult with his principals.

Mack.—Work has been resumed at this mine and will be conducted on a larger scale.

Soulsby.—This mine at Soulsbyville, Wm. Sharwood, superintendent, has resumed work after a short shut down.

Willetta Mining and Milling Company.—This property near Chinese Camp, Geo. E. Stayton, superintendent, is in condition for a long run. Electric power is to be brought in and concentrators added to the mill.

YUBA COUNTY.

Land available for gold dredging along the Yuba river, near Marysville, is selling at $250 per acre.

Two dredges are running day and night on Bear River dredging the main channel in summer and working on the higher lands during the flood period.

COLORADO.

BOULDER COUNTY.

Celma Mining and Milling Company.—This company is working the old Tillie Butzel Mine under a bond and lease. Mr. Young is manager. The shaft is down 225 ft. The ore is blue quartz, showing gold and silver tellurides.

CLEAR CREEK COUNTY.

Consolidated Alpine Gold and Silver Mining Company.—This company has purchased the Smith Mill, at Idaho Springs, to treat the ore from its Alpine Mine. The mill is a 75-ton concentrating plant equipped with crushers, rolls, jigs, stamps, two Huntington mills, amalgamation plants and tables. It was secured by Thomas B. Crow, the manager.

Richland Company.—This recently incorporated company has taken over the Big Chief Tunnel and group of claims at the mouth of the Ute Creek; Ernest Richter, of Cincinnati, O., is president; Fred. C. Morse, of Idaho Springs, Colo., vice-president, and John C. Wurst, of Cincinnati, secretary and treasurer.

Vidler Tunnel.—A streak of galena was uncovered recently while excavating for the foundation of the power plant.

FREMONT COUNTY.

Boma.—This mine, owned by John Johnson, just east of Whitehorn, is sinking a working shaft on a gold quartz vein 4 ft. wide.

Colorado Mines Consolidated Company.—This company, operating the Last Chance Mine, near Whitehorn, has located the ore shoot. The property, under the management of Eddy Bros., in 1893, shipped about five cars of ore, which gave $70 per ton in silver and lead and some gold.

Fairview.—Matlock & Draper have the shaft on this property down 53 ft., and have a 4-ft. vein of ore that will pay to ship. The showing is enough to warrant development on a larger scale, and they have ordered a 12-h.p. gasoline hoist. Four claims adjoining this property were sold the last week to Eastern people.

Hurshberger Tunnel.—Iowa men have taken hold of this tunnel, near Whitehorn, and will push it into Cameron mountain. The tunnel is in about 300 ft.

Independence.—This mine on Cameron mountain has been bonded to Dr. T. A. Jackson and associates.

Maud S.—F. A. Cole has three men working on this group, on Gold hill. He has a shaft down about 50 ft., with good strong vein.

GILPIN COUNTY.

The new mill at the mouth of Elk Creek, owned and operated by L. J. Mounty & Co., is working satisfactorily. It treats the ore of the Mackey and Sarah Jane mines, near Apex.

Beacon of the West.—Idaho Springs men intend to develop this old Russell District property under a lease and bond. M. W. Tanner, of Idaho Springs, will be in charge.

Cashier Gold Mining and Reduction Company.—A wagon load of smelting ore from the 600-ft. west level of the Pittsburg mine brought $888. The ore carried 11.24 oz. gold, 10.5 oz. silver, and 13.90 per cent copper.

Dirigo Group.—The 6 claims comprising this group at Wideawake, in the Hawkeye District, are reported sold to New York men for $22,500. One tunnel is in 500 ft., and another 650 ft.

Evergreen.—This group of 6 claims, near Apex, was sold recently to W. R. McCormick, of Denver, for $25,000. The purchaser will develop the property by tunnels. The ore carries copper, silver and some gold.

HINSDALE COUNTY.

Isolde.—A 3-ft. vein of rich gold ore has been uncovered in this mine in Burrows Park. The company is cutting a station and will install machinery at once.

LARIMER COUNTY.

Grand Republic Copper Mining Company.—This company owns 50 acres of mineral land 7 miles south of Pearl and 3 miles southeast of the Big Horn group. The people interested are practically those making up the Mount Zirkel Company. Sam Fields is in charge of the work. The property is equipped with a boiler and a 6 by 8 hoist. The shaft is down over 200 ft. and shows at the bottom a small paystreak of copper and iron pyrites.

Wolverine.—The Coldwater Mining Company has resumed work on this group of 6 claims that adjoins the Mount Zirkel Company's property on the north. The group is on the west branch of Big Creek about 3 miles south of Pearl. The prospect shaft is being unwatered. The main working shaft is down 130 ft. The ore is largely chalcocite, with specks of chalcopyrite. The machinery includes a 40-h. p. boiler, 6 by 8 hoist and a No. 2 Cameron sinking pump. G. L. Baldwin is president and Edwin Gillis, of Coldwater, Mich., general manager; E. S. Drury, of Encampment, Wyo., is resident manager.

LAS ANIMAS COUNTY.

Special Agent Max Pracht, of the United States Land Office, has discovered a wholesale forgery of names to secure about 20 patents to coal lands in this county. The irregular entries were for 100 acres each.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Zinc Production.—The production for July was over 8,000 tons. About half of this came from the Moyer property of the Iron Silver combination, while some 3,000 tons came from the Western Mining Company properties. The Empire Zinc Company and the European market are the heaviest buyers.

A. M. W.—Repair work is going on, while the Adams shaft is producing sufficient ore to keep the mill turning out about 50 tons daily of good concentrates.

Belgian-Frenchman Mining Company.—In the old Belgian workings at the 440-ft. level 3 ft. of good carbonate ore, averaging $25 a ton, have been opened up.

Caribou.—One hundred tons daily of high-grade ore are shipped. The immense iron shoot has been found with drills in several parts of the property, and at the extreme eastern edge, where 65 ft. of iron has been cut, it is the intention to sink a new shaft.

Cloud City Mining Company.—This company has caught some fair-grade material, and while shipments have been small preparations are being made for an increase.

Fryer Hill Mines Company.—Shipments of 100 tons a day keep the company on a paying basis, and permits of the extensive prospecting work planned. The new shaft on the Pride of the West is down 330 ft. to contact, and machinery is being put in position prior to sinking another 50 ft. The Harvard shaft is to be sunk soon. The company is handling 330 gals. water per minute.

Gilt Edge.—Machinery is about in place to make connections with Nos. 1 and 2 shafts.

Golden Fleece.—This property includes the Golden Fleece, Wabash and Campbird groups at Twin Lakes, under lease to local and Eastern people. A trench has been run several hundred feet below the old workings to prospect a vein which shows a continuous ore body for 40 ft. The ore is gold-copper quartz, and assays from $3 to $300 a ton.

Ibex Mining Company.—The company is shipping some 250 tons daily, much from the Little Johnny properties. Connections at No. 4 shaft are made with the Yak tunnel.

Midas.—Connections with the Coronado are completed, and the Midas is preparing for very heavy shipments from its iron deposits.

Morning and Evening Star Consolidated Mining Companies.—On the Morning Star territory the Ladder, Porter, McHarg and Upper and Lower Waterloo shafts are producing 75 tons daily. The Evening Star is producing 20 tons.

New Leadville Home Mining Company.—While shipping 100 tons daily of good grade iron the company is sinking an incline on the new iron body opened with the diamond drill, and has ore showing on all sides. The stuff assays 10 to 12 oz. silver, with 43 per cent excess and some lead.

Prospect Mountain.—This territory, east and north of Leadville, where a large body of hematite iron was located some time ago, is to be thoroughly prospected, if capital can be raised.

Resurrection Mining Company.—Shipments were about 75 to 100 tons daily during July, the crude ore going to the smelter. The new mill resumes operations this month.

Sequin.—The new shaft on this Rock Hill territory is about under way. It is 600 ft. from the old Sequin, and is to go down 550 ft. on the first contract.

Yak Mining, Milling and Tunnel Company.—The company is shipping about 150 tons daily from various sulphide bodies, and is carrying on extensive prospecting in virgin territory.

MESA COUNTY.

Chicago-Unaweep Canyon Mining and Smelting Company.—This company is working the Annie group of claims in the Unaweep District. The property is being developed by two shafts. The ore is chalcopyrite, carrying gold. The mine is equipped with a hoist and electric plant. James Walker, of Grand Junction, is manager.

Grand Junction Smelting Company.—The smelter is expected to be in operation early in September. It is to be of 450 tons daily capacity, with copper furnaces, and will use the Loder process. The officers are: I. N. Patterson, of Franklin, Pa., president; William Rogers, vice-president; J. V. Howard, secretary; George E. Marvin, general manager, with Henry W. Edwards, metallurgist.

Western Slope Copper Mining and Smelting Company.—This company's property consists of 14 claims in and about Castle Canon. On the Mollie Brooks is a 157-ft. shaft and a plant consisting of a 50-h. p. boiler, a 6 by 8 Hendrie & Bolthoff hoist and a No. 7 Cameron pump. On the Nancy Hanks claim there is a 250-ft. shaft and a new 2-compartment shaft down 132 ft., with a similar power plant. The ore carries copper and gold. The company contemplates the erection of a 50-ton concentrator. The officers are: Henry M. Marden, of Boston, president; F. E. Blaisdell, vice-president and general manager; James S. Howard, of Boston, secretary, and W. A. McCurdy, of Grand Junction, treasurer. W. A. Lynch is superintendent.

PUEBLO COUNTY.

A compromise has been effected in the contest over several thousand acres of coal lands near Pueblo, whereby the government will receive from purchasers $20 per acre instead of $2.50 per acre, as formerly. The lands were originally listed as timber and stone locations. The contest is said to have been in reality between the Colorado Fuel and Iron Company and the Victor Coal Company on one side and the Union Fuel and Iron Company on the other. All proceedings on both sides have been discontinued.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

American Exchange Mining Company.—A tunnel has been started to cut the Wall Street vein on this Silverton claim, at a vertical depth of 400 ft.

Big Colorado.—Lumber is arriving for the big flume. Ground is also being broken for the new power house near Silverton.

Bullion King.—Dr. B. F. Cummings has men on this Silverton property, and will soon resume shipments for the season.

Camp Bird Extension.—A special meeting of the stockholders is called for August 22, to devise means for paying an indebtedness of $41,000. The crosscut near Silverton is now in 2,400 ft., and every effort is being made to cut the lead before the meeting.

Copper King.—This Silverton property is to start at once with a full force, under the direction of Martin Schmelzer.

Eureka Exploration Company.—This company is operating the Silver Wing Mill about two-thirds time on Frederica ore.

Freeport & Cripple Creek Gold Mining and Milling Company.—A rich strike of copper and galena is reported from the Ransome tunnel, near Silverton, at a depth of 450 ft.

Green Mountain.—A strike of a 10-ft. vein of $20 ore is reported from the Green Mountain tunnel, near Silverton.

Isolde.—The No. 2 tunnel near Silverton has cut the vein and found high grade gold ore.

Little Bessie.—Eight men are busy; as soon as timber arrives, sinking will be resumed in the shaft.

Mineral Point District.—Brunner & Metcalf, operating the Bonanza King, have 80 tons of $40 awaiting shipment. The old London is being overhauled, and new machinery put in. The Bushwhacker will shortly ship its first car of ore for many years. The Lion tunnel is working full force, and shipments are regular. The Polar Star will shortly resume under lease. The Early Bird, under Oscar Olson, is shipping high grade galena ore. The Red Cloud Mining Company, with R. N. Bagley as manager, has planned to tap the Red Cloud group and 28 other claims by a tunnel, starting from Mineral Point.

Royal Mining Company.—A rich streak has been cut in the south drift of the King tunnel, near Silverton. The main tunnel is being pushed to cut the Mazeppa vein.

San Juan Smelting and Refining Company.—The new 5,400 ft, tramway is expected to be ready by September 1. It will have a capacity of 500 tons per 24 hours, and is of the Bleichert pattern. The estimated cost is $16,000. The two upper bins at the Henrietta Mine will have a capacity of 250 tons, while the two lower ones at the railroad will hold 300 tons. The estimated cost of transporting ore from mine to railroad is 15c. per ton, as against $2.50 per ton by wagon, and 1,500 tons of ore are already broken. The ore already blocked out aggregates 48,000 tons.

Shenandoah No. 3.—A large force of men, with supplies for the season, has been sent to this mine. H. M. Bennett is superintendent.

Silver Lake.—A thorough underground survey is being made by Prof. Van Winkel and assistants, and an estimate of values of blocks will be compiled.

Tobasco Mining Company.—The new mill near Silverton will start in a few days; 6,000 tons await transportation over the tram.

Tom Moore.—J. Moorhead has contracted to drive the tunnel another 100 ft., making it 2,300 ft. long.

SAN MIGUEL COUNTY.

Alta Mines Company.—This company at Telluride has started the new mill and results are satisfactory. Twenty stamps were installed during the winter and the management is handling 80 tons of ores every 24 hours. Eight Gilpin County bumping tables and 10 Frue vanners are used. The mill reduces four or five tons of mine run into one of concentrates, carrying a high percentage of lead.

Butterfly-Terrible Gold Mining Company.—At the annual stockholders' meeting, held recently in Denver, the old board of directors was unanimously re-elected. The following officers were also elected: Calvin Bullock, of Denver, president; J. H. Reading, of Philadelphia, vice-president; Francis J. Hobbs, of Colorado Springs, secretary and treasurer. The annual report showed an expenditure on mine and mill of $47,221 with $4,714 cash on hand.

SUMMIT COUNTY.

Aetna & Vesuvius.—People from Columbus, O., have started work on these properties on Fletcher Mountain.

Breene.—This mine, near Kokomo,, has resumed shipping. A large body of iron sulphide ore is opened, and much development work is being done.

Gold Cord Mining and Smelting Company.—This company operating on Jack Mountain, has abandoned work on the drift, and is driving the tunnel.

Maximus.—Carl Anderson is starting up this old mine, on Fletcher Mountain.

Uthoff.—This is now the largest daily shipper in Kokomo. A large force of men is employed. Most of the ore is shipped to the Golden Smelter.

Wilfley Mill.—This mill is shipping good concentrates.

IDAHO.

ADA COUNTY.

Overland.—A large body of ore, averaging about $40 per ton is reported opened in this group at 600 ft. depth. The property adjoins the Ella Hill, near Boise.

BLAINE COUNTY.

Aetna.—This group of five claims, near the Minnie Moore Mine, is being opened by Neil Campbell, of Bellevue. The claims have been bonded to Mr. John Kitchener, of Toledo. About 2,000 ft. of work has been done, the lowest workings being 350 ft. deep. Machinery, to consist of a boiler, hoist and pump, will probably be installed.

Bald Mountain Mining Company.—This company owns the Ontario group of 13 claims along Warm Spring Creek, 14 miles west of Ketchum. The 40-ton mill is equipped with crushers, jigs and two sets of rolls. The main tunnel is in 400 ft., with a vertical depth at the face of about 250 ft. The vein is 4 ft. wide and carries a high grade 12-in. pay-streak. The shipping ore is said to average 100 oz. in silver and 65 per cent in lead. The milling ore is concentrated four to one product. A second tunnel is in progress. This company is composed of Messrs. Frank Parsons and Thomas Brennan, of Hailey, and T. O. Hampton, of Salt Lake, Utah. Mr. Hampton is in charge.

Big Camas Group.—This property, adjoining the Tip Top, is worked by C. D. McClure and others, of St. Louis.

Idaho Mines Consolidated Company.—This company is expected to begin active operations near Hailey immediately.

Tip Top.—This group of five claims, near Hailey, is owned and operated by J. Q. Packard, of Salt Lake City. The 20-stamp mill is expected to start shortly. The water supply is secured from Rock Creek by nearly three miles of piping. Capt. J. A. Lusk is in charge.

BOISE COUNTY.

United Mines Company.—This company is working the Kentucky quartz mine, on Fayette River, near Marsh. The tunnel is in 400 ft. The company intends erecting a 50-ton mill later, and is said to have an interest in the smelter at McKay. Gerald Hupperty has charge.

CUSTER COUNTY.

Black.—This old group of mines, near Custer, adjoining the Yellow Boy, is reported sold to New York men, who deposited $11,000 in a local bank to carry on work. Ravenel Macbeth, of the Lucky Boy Company, is president; Reginald Coryell, secretary and treasurer. The controlling interest is held by Dr. W. E. Gorton, of New York City.

IDAHO COUNTY.

American Eagle.—Ten stamps are to be added to the mill on this property, near Elk City.

Lucky Lad.—A 2-stamp mill is to be placed on this Buffalo Hump property. The company expects to go down 200 ft.

NEZ PERCES COUNTY.

Yellow Boy Mining Company.—This recently incorporated company will work the Yellow Boy Mine, on Cave Gulch near Lewiston. A 10-ton shipment has been made to the Tacoma Smelter, giving good returns.

SNOHOMISH COUNTY.

Sunset.—The controlling interest in this mine, in the Index District, is reported purchased by W. H. Baldwin for Eastern men. E. A. Ritter, of Colorado Springs, Colo., is to have charge. The force is to be increased and development work is to be pushed. About 2,000 ft. of underground work has been done. At a recent meeting at Everett the following officers of the new company were elected: John C. Denny, president; H. W. Holmes, vice-president; W. G. Smallwell, treasurer, and W. W. Black, secretary.

ILLINOIS.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Jones & Adams Company.—This company has closed its No. 1 mine, northeast of Springfield, to retimber the

hoisting shaft and make some other repairs. It expects to resume operations about September 1.

Sangamon Coal Company.—This company is now hoisting coal again. Their mine is northeast of Springfield, on the Chicago & Alton and Illinois Central railroads. Frank E. Fisher, of Springfield, is general manager.

Springfield & Chicago Coal Company.—This company, sinking a coal shaft on the Chicago & Alton Railway, about 3 miles northeast of Springfield, is having trouble with water and in a month has reached a depth of but 55 ft. H. H. Deveroux, of Springfield, is president, and George Streble, superintendent.

INDIANA.

James Epperson, State mine inspector, is making his mid-summer inspection of mines. He says there are about 400 small mines in the state. By "small mines" he means those that work from 1 to 10 men. Under the Indiana law only mining operators who employ 10 or more men are required to make reports. Some of the small operators employ 11 or 15 men, but give out that they employ ten or less. Mr. Eperson is hopeful that the next Legislature will make all the mines in the State amenable to the statutes.

PERRY COUNTY.

(*From Our Special Correspondent.*)

American Cannel Coal Company.—This company, controlling about 5,000 acres of land, is putting down an oil well 2 miles from Cannelton. In the northern part of the county eight or ten paying wells have been drilled. Oil is struck at a depth of from 700 to 1,000 ft.

VERMILLION COUNTY.

(*From Our Special Correspondent.*)

Coal Discovery. A 4-ft. vein of block coal has been struck near Dresser. A 4-ft. vein has also been struck on the Edward Brown farm. Robert Winks, county auditor and others have leased 3,000 acres and development will begin. A move is on foot to get the, Chicago, Terre Haute & Southern Railroad to build its line through this new field.

LOUISIANA.

CALCASIEU PARISH.

(*From Our Special Correspondent.*)

Jennings' Oil Field.—Superior Oil Company's No. 2 well came in recently, gushing over the derrick. The Champion Oil Company, capital $100,000, has leased 80 acres 4½ miles north of Mamon, and will develop the property. Home Oil Company's No. 3 well is just in and enlarges the field 500 ft. to the west. The Crowley Mamon Oil Company will construct a 6-in. pipe line from Jennings to Crowley. There are said to be 55 producing wells in the Jennings field, and should the Pelican well and Alabama No. 1, now being drilled, turn out to be producers, the proven field will be enlarged over 1,000 ft. to the north and west.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

In the Hibbing District the United States Steel Corporation's mines number 11, with one more to come immediately. These include the Burt and Morris open-pit mines, the Hull, Rust, Day, Sellers, Pillsbury, Clark and Chisholm, underground, and the St. Clair, also underground and until very recently the property of the Oliver-Snyder interests operated under a contract by the Minnesota Iron Company. The recent Clairton Steel purchase affects this mine.

Kinney.—This property, in Section 14, T. 58, R. 19, is shipping and will take out about 75,000 tons this year. Its capacity is easily several times that. Less than a year ago the site was a virgin forest. Since then more than 40 acres have been cleared of timber and brush and a hole from 40 to 50 ft. deep, 100 ft. wide and 300 ft. long has been cut above the ore. The contracting company has a 2,000,000-yd. contract far from completed. Two large shovels are stripping day and night and during June 91,000 yds. were moved. A 3-compartment shaft, carrying a pair of 3-ton skips worked in balance, has been sunk 115 ft. Quicksand was encountered, but the bottom timbers were shod with steel and the shaft built up from the top as it sank. Drifts are being driven and raises made to the surface of the ore in the stripped area. Milling down will start in a week or two. Two pumps, No. 7 and No. 10 Cameron, keep the pit and mine free from water.

MISSOURI.

ST. FRANCOIS COUNTY.

(*From Our Special Correspondent.*)

The labor troubles that have been seriously interfering with the operation of most of the lead mines of St. Francois County are now adjusted and all the mines are again in operation. The men are working on an 8-hour basis, conforming to the new State law, in the mills and smelters, as well as in the mines.

Commercial Lead Company.—This company, a local company, has leased the Columbia property, and under the management of H. J. Coutwell, the property promises to become a large producer again, as new orebodies are being opened.

St. Joe Lead Company.—This company has completed another large addition to its roasting plant at the Herculaneum Smelter.

MONTANA.

DEER LODGE COUNTY.

Knickerbocker Mining Company.—This company, comprising Mr. Cory and associates, is operating mines near Beaver Creek, across the Missouri River from Helena, and is shipping high-grade copper ore. Three cross-cuts are being pushed.

Twilight.—The mill, near Anaconda, has been leased by Lucien Eves and J. J. Fitzpatrick, of Butte, who will start operations at once. The lessees also work the Southern Cross Mine.

FLATHEAD COUNTY.

B. & B. Group.—Greenough & Larson, owners of the Poorman Mine in the Coeur d'Alenes, have bonded this group of mines, at Troy, and have 30 men developing the property, which shows silver and lead ore.

GRANITE COUNTY.

Granite Bi-Metallic.—Judge Napton recently appointed Paul F. Fusz receiver of this company, with power to resume operations at once. His bond was fixed at $200,000. Mr. Fusz is general manager of the company. The total amount of attachments will probably exceed $75,000. The sheriff recently arrested Iso Ksovicevic, an Austrian, for stealing bullion recently recovered from the company's mill.

JEFFERSON COUNTY.

Montana Mineral Land Development Company.—This company, owning the Eva May property in the Cataract District, is about to resume work, having liquidated its indebtedness. The property has been idle for three years. The erection of a McDonald smelter is contemplated. Geo. B. Drankenfeld is manager.

Pittsburg-Montana Development Company.—A hoist is being installed on this company's Eastern Star Mine, in the Cataract District, near Basin.

Rose Gold Mining and Milling Company.—This company is developing its property, near Wickes, and has three shifts employed driving a tunnel. It owns 14 quartz claims, two placers and two mill sites.

Silversmith.—Ore running over $250 to the ton is reported struck in this property, near Basin, by D. J. Sweeny.

Sure Thing.—This mine, near Bullion, is reported to have produced since being bonded last February to Conol & Martin about $75,000. The final payment has been made. About $20,000 were expended in development. The Basin & Elliston Railroad will pass through the property. Later a smelter may be erected.

MADISON COUNTY.

Big Four Company.—This company has decided to sink to 150 feet in its property near Ferguson. The vein is about 7 ft. wide, with a pay streak of 37 ins.

MISSOULA COUNTY.

A good find of gold ore is reported by J. M. Graves on Miller Creek, about 10 miles from Missoula. A sample assayed in Butte showed $3.42 silver and $62.50 gold.

Monitor-Richmond Company.—Negotiations are pending for the erection of a $250,000 smelter near Saltese.

POWELL COUNTY.

Coloma Gold and Silver Mining Company.—The company is sinking a 500-ft. incline shaft to develop the property near Coloma.

SILVER BOW COUNTY.

The Supreme Court on July 25 granted to F. Augustus Heinze, on request of Attorney Basch, a remittitur in the Minnie Healy case. All statutory rights were waived by Heinze, and the remittitur granted. The court adjourned until October 6.

Amalgamated Copper Company.—Nine of this company's mines at Butte and the Anaconda Smelter are expected to start about August 20, when nearly 5,000 men will return to work.

Pittsburg & Montana Copper Company.—Work is progressing rapidly on this company's smelter in East Butte. Good ore is reported in the Farrel shaft while cross-cutting the lead on the 1,200-ft. station. The ore shoot is the same as that encountered on the 800 ft. level.

Reins Copper Company.—The new engine installed by this company at its Combination Mine, at Meaderville, started recently. Dr. J. P. Reins is president.

SWEET GRASS COUNTY.

Cowles Mining Company.—This company has about 20 men busy on its property, near Independence, and intends building a cyanide plant. E. H. Cowles is superintendent.

NEVADA.

ESMERALDA COUNTY.

Consolidated Esmeralda Mining Company.—This company has purchased a 40-stamp mill for its mines near Hawthorne. The plant was erected at Jordan several years ago, and includes 5 power drills, air compressors, 2 rock breakers and a hoist. Mr. Concord is superintendent.

NYE COUNTY.

(*From Our Special Correspondent.*)

Montana Tonopah.—The returns from ore shipped to date are: 116,985 lbs. of 1st, 2nd and 3rd class ores of a value of $13,436. The 1st class ore carried from 2.84 to 6.98 oz. in gold and from 264 to 651 oz. silver per ton. The 2nd class 3.2 oz. gold and 319 oz. silver per ton, and the 3rd class ore, 1.35 oz. gold and 148 oz. silver per ton.

In addition 10 tons were shipped to Reno for trial treatment at the Wedekind Mill; returns have not been received. The main shaft is down 625 ft., but the principal work is on the northeast drift of the 412 ft. level. This drift is in 72 ft., 60 ft. of which have yielded $20,000 worth of ore. The company is working two electric drills.

The company shipped two carloads more of high-grade ore from the 462-ft. level and about two more loads are broken down in the drifts. The ore is from the development of what is considered the main ore body, which is from 5 ft. to 8 ft. wide. The ore is a pure sulphide, carrying horn silver, gold, and, in places, copper. In the west cross-cut on the 512-ft. level, 125 feet from the shaft, the cap of a vein of oxidized ore has just been broken into, which resembles Mizpah ore, and assays from 486 oz. silver and 4 oz. gold to $1,000 per ton. The main shaft is down 625 ft., and in all 2,100 ft. of work has been done. The mine is equipped with a 34-ft. gasoline hoist, Durkee electric drill, and is lit by electricity.

Tonopah Gold Mountain Mining Company.—This company has made a trial crushing of 5 tons of ore at the Kinkead mill at Tonopah, which yielded $41.45 silver, $21.40 gold per ton and 415 lbs. concentrates not yet assayed. The treatment charge was $10 per ton.

Tonopah Mining Company.—This company has installed a compressor plant and 150 h.p. gasoline engine. It is understood that at the meeting of stockholders which will be held as soon as Mr. John Hays Hammond's health will permit him to attend, a definite statement will be made as to the company's plans for the installation of reduction works.

OREGON.

Cracker-Oregon.—A contract for 300 ft. of tunnel work on this group in No. 2 tunnel has been let to Walter Allen. The main tunnel is in over 1,000 ft.

Dixie.—Frank Ray, manager of this group on Granite Boulder Creek, recently went to San Francisco to order machinery, consisting of 20-ton 4 ft. Kinkaid Mill, a 7 by 10 Blake crusher, and a Woodbury concentrating table. The mill is to be operated by water power.

Golden Chariot.—Sol Camp, former superintendent of the Elkton Company, near Cripple Creek, Colo., and Lou Williamson, have made a strike of good ore on this claim about two miles from Sumpter. They recently bonded the property from the Sumpter Valley Railroad Company for $5,000. The ore body lies in a limestone formation. The tunnel is in 183 ft.

BAKER COUNTY.

A large electric power plant of a maximum capacity of about 10,000 h.p. is to be erected at Sparta to furnish power to Baker City, Union, La Grande, Sumpter and mines in the surrounding district. Water power will be secured from Eagle Creek, conveyed by a 3-mile flume, 10 ft. wide and 5 ft. deep, to the power station. The plant will cost about $200,000 and is to be completed by January 1, 1904.

GRANT COUNTY.

Quebec.—This mine, on Quebec Hill, in the Alamo District, is reported sold to Detroit, Mich., people. The property is owned by the Oregon-Colorado Company, and is equipped with a 10-stamp mill, concentrator and steam plant.

LANE COUNTY.

(*From Our Special Correspondent.*)

Bald Butte.—Next to the Black Butte Mine, this is the most extensively developed property in the Black Butte District. It has been opened on three levels, showing a large amount of low grade ore.

Black Butte.—A strike is reported on the 850 ft. level at this quicksilver mine. Three veins were cut in a cross-cut from the surface 400 ft. long, one being over 20 ft. wide. Assay values are reported as high at 5 per cent mercury. A contract for a 200 ft. ex-

tension of the main tunnel has been let. Over 12,000 ft. of underground work has been driven within the last four years and plans are now under way for the construction of a new 100-ton furnace, which, with the present furnace capacity, will give the mine an output of 150 tons per day.

Cinnabar Butte.—This quicksilver property, owned by Portland people, has several hundred feet of development work. Plans are being considered for systematic development.

PENNSYLVANIA.

ANTHRACITE COAL.

The State recently purchased 8,600 acres of the old charcoal forest of the Logan Iron and Steel Company in Juniata Valley, for $21,000. The tract will be preserved by the State as a forestry reservation. Formerly it supplied wood for running the Emma and Greenwood furnaces, near Lewistown.

Philadelphia & Reading Coal and Iron Company.—This company's Buck Mountain Colliery slope No. 1 was opened recently, after two years' idleness. About 300 men are employed.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Cuyahoga Mining Company.—Sinking and tunnelling are under way. The company has recently patented its property, and has had a survey run for a mill.

Grantz Gold Mining Company.—Development is under way on the Roosevelt and St. Elmo claims.

Inter-State Gold Mining Company.—The main shaft is 70 ft. deep.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Capital Gold Mining Company.—Articles of incorporation have been filed by John Harrop, of Lincoln, Nebraska, and C. H. Nelson and C. P. Ames, of Deadwood, S. D. The company is capitalized at $1,500,000, $1 shares. It is to work a group of claims recently purchased of Freeman & Lawrence at Texana, along Deadwood Gulch. C. P. Ames, of Deadwood, is manager.

Dakota Mining and Milling Company.—G. H. Clevenger has been engaged as chemist to succeed J. B. Empson, who has gone to the Reliance Company. The Dakota plant is to be enlarged, and will start again this fall.

Dizzy Mining Company.—A diamond drill has arrived and will be used to explore the flat formation in the vicinity of Maitland. H. H. Francis, of Custer, and E. F. Roberts and E. M. Thompson, of Deadwood, are interested.

Golden Reward Mining Company.—The annual meeting has been called for August 4 at Deadwood. It is expected that plans will then be made for starting the smelter at Deadwood, which closed during March, owing to labor troubles. The company contemplates building a large cyanide plant near the Toronto Mine at Terry, for the transportation of the ore.

Hidden Fortune Gold Mining Company.—Alterations are under way at the 300-ton mill, and amalgamating plants are being added.

Jupiter Gold Mining Company.—Thirty of the 40 stamps are running. After amalgamation the ore is treated by cyanide.

New Reduction Plants.—There are in process of erection new mills and additions to mills as follows: Horseshoe Mining Company, cyanide, 500 tons; Hidden Fortune, cyanide, 300 tons; Homestake Mining Company, 100 additional stamps, 400 tons; Gilt Edge-Maid, cyanide, 125 tons; Phoenix Company, cyanide, 250 tons; Reliance Mining Company, cyanide, 250 tons; Lundberg-Dorr-Wilson, cyanide, 75 tons; Golden Crest, cyanide, addition, 100 tons; Lexington Hill, cyanide addition, 100 tons; Spearfish, cyanide addition, 75 tons.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Ajax Mining Company.—The old Standby Mill is being repaired preparatory to a run. Work in the mine is being done under contract.

Columbia Gold Mining and Milling Company.—Differences are being adjusted and the company expects to resume work in the shaft at Rockford before fall. John Mundt, of Sioux Falls, one of the principal owners, has been on the ground this week.

Mainstay Mining Company.—The Bismarck 40-stamp mill is practically ready to run and the company is getting out ore at the Ida Florence Mine.

Sunbeam Mining Company.—The new 10-stamp mill is about ready to run. Contracts are being let for further work in the shaft.

TEXAS.

HARDIN COUNTY.

Sour Lake Oil Field.—Fifty-six wells have been completed in this district, 25 of which are flowing, 20 pumping and 11 shut down owing to low price of oil; 79 wells are being drilled and 56 rigs under construction or completed. The amount of tankage is reported as follows: 105 wooden tanks of 1,200 bbls. each, 7 iron tanks of 37,500 bbls. each, 1 of 55,000 bbls. The tanks under construction are: 20 wooden of 1,200 bbls., 1 iron of 37,500 bbls., 2 earthen of 100,000 bbls., and 1 earthen of 225,000 bbls. There are 2 pipe lines, carrying 35,000 bbls. of oil daily, and 7 more under construction.

(*From Our Special Correspondent.*)

Saratoga Oil Field.—The Beaumont Syndicate has subdivided its holdings into 5-acre tracts, which are selling at from $200 to $1,000 per acre, according to location. The Poor Man's Oil Company has purchased a tract and the Hamilton Oil Company another. Both are Houston concerns, and drilling will start at once. Buse well No. 6 and Southern Pacific well No. 4 have been started. Buse No. 3 is down 900 ft. McFadden well No. 2 is a gusher, extending the field 900 ft. to the south. The Star Petroleum Company's pipe line to Sour Lake will be finished in August, and the Guffey Petroleum Company is securing the right of way for another line.

Sour Lake Oil Field.—The Heywood Brothers have a big gusher, said to equal any in the field. A big boom is on here, and new wells are started every day. The production has increased so that it cannot be handled by the present pipe lines and no storage is available. Oil has dropped rapidly and can be bought for 15c. per barrel. The price will remain low until tankage can be built. Owners of pipe lines and tanks will reap the benefit, as they did at Beaumont. The low price will stimulate consumption, and the price will go up in a few months. It is not likely that producers will enter into foolish contracts, as many Beaumont companies did in 1902. The production now exceeds that of Beaumont.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Beaumont Oil Field.—The Lone Star & Crescent Company's pipe lines, including that to Sabine Pass, have been transferred to the Star Petroleum Company, which will ship to New Orleans consumers. Prices are still tumbling. Beaumont crude is slow sale at 30@32c. per bbl. Big production and poor storage facilities at Sour Lake will probably cause a further drop. There is no possibility of crude advancing in price for some weeks, and it may drop to 25c. or even lower. Very little tankage in the field is empty.

UTAH.

BEAVER COUNTY.

Majestic Copper Mining and Smelting.—Manager W. H. Alexander has taken up the matter of transportation with the officials of the San Pedro, Los Angeles & Salt Lake railroad. The company is endeavoring to get the railway to build spurs to its various mines. William McDermott is on the ground looking into the matter of tonnage. The proposed extension from Frisco to Newhouse, about 9 miles, where the concentrator and smelter for the Cactus Mine are to be erected, is also under investigation.

SEVIER COUNTY.

Boston & Gold Mountain Mining Company.—C. E. Watkins, president, and A. M. Watkins, secretary, have resigned. C. G. Goldbranson, of Richfield, was elected president and A. B. Williams, also of Richfield, a director.

Sevier Consolidated.—This company's Trent mill of 50-ton capacity is enclosed. There is also to be a 50-ton cyanide plant to treat tailings. The company is also erecting a 6-in. pipe line, a mile long. Capt. H. C. Lawrence is superintendent.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Consolidated Mercur.—There is some delay in completing the installation of the Moore slimes process. President Dern says the work will not be done until about August 15.

WASHINGTON.

FERRY COUNTY.

Copper Mountain.—The tunnel is in 650 ft. A contract has been let to run another 100 ft.

Belcher.—The No. 3 tunnel is in 120 ft. Six men are employed and 6 more will resume work on the No. 1 tunnel.

Lone Pine-Surprise.—During June 1,200 tons of ore were shipped to the Crofton Smelter, and 300 tons to the Hall Mines Smelter. The working force is 35 men.

Morning Glory.—Three car-loads of high-grade ore were shipped the first week in July. The shaft is nearly completed 300 ft. below the addit level.

Trade Dollar.—Two carloads of ore during the week ending July 18, were shipped to the Hall Mines Smelter, at Nelson, B. C.

SKAGIT COUNTY.

Livingston & Helena Coal and Coke Company.—It is expected that two months will be required to unwater this company's mines at Cokedale. The mines are pumped out to the 600 ft. level, with 650 ft. more to go. A 1,200 gal. per minute pump is used. A large force is repairing the washer and installing new hoisting machinery; 100 additional ovens are to be built.

STEVENS COUNTY.

Old Dominion.—The 60-ton concentrator, near Colville, has been repaired and started with two shifts. F. W. Kyle, the lessee, has 22 men employed. The lower tunnel is in about 2,400 ft. and has cut the vein at a vertical depth of 800 ft.

WEST VIRGINIA.

FAYETTE COUNTY.

Pennsylvania & New River Coal Company.—This recently incorporated West Virginia company is reported having purchased 4,000 acres of Quinnimont coal lands on New River, and will begin development at once.

MARION COUNTY.

Hoult Coal and Coke Company.—This company recently sold its coal property at Hoult to New Haven, Dunbar and Dawson, Pa., men for $70,000.

WYOMING.

ALBANY COUNTY.

Buckeye Mining Enterprise Company.—This company is working its property of 4 lode and 3 placer claims on French Creek. The officers are: Dr. S. S. Cox, president; M. J. Henninger, vice-president; E. F. Resek, secretary; Harry Gaun, treasurer; M. J. Alton, general manager, and M. M. Switzer, mine superintendent.

CARBON COUNTY.

Doane-Rambler.—This property is being unwatered. About $100,000 worth of low grade ore is reported on the dump. P. C. Armbruster is manager.

Wyoming Coal Company.—This company, which recently purchased the Cambria Coal Mines, near New Castle, is opening two mines 7 miles west of Sheridan, in Sheridan County. The vein is 21 ft. thick and the coal is good quality lignite. The company will equip the mines with modern machinery, steel tipple, etc.

SWEETWATER COUNTY.

Belgo-American Oil Drilling Company.—This company, which is drilling wells near Salt Wells, has one well down 2,515 ft. and intends sinking 1,000 ft. deeper. Three new derricks are being erected.

UINTA COUNTY.

American Consolidated Oil Company.—Several rigs are en route for this company's property at Spring Valley. A. B. Butler is president.

Atlantic & Pacific Oil Company.—This company has recovered its lost string of tools out of No. 3 well.

Bettys.—This oil well, near Evanston, is about 550 ft. deep. Casing has been ordered for the well.

Inter-Ocean Oil Company.—This company is about to erect three derricks on its property near Evanston.

Ohio Wyoming Oil Company.—Two standard rigs are to be erected on this company's holdings, near the Bettys property.

FOREIGN MINING NEWS.

AFRICA.

NATAL.

Coal production in May is reported by the Mines Department at 51,849 long tons, against 56,527 tons in May, 1902; a decrease of 4,678 tons. Exports of coal for the month were 72 tons, and 20,813 tons were sold to steamers in the port of Durban.

RHODESIA.

Gold production in June was 22,166 oz. bullion, being 29 oz. more than in May. For the six months ending June 30 the total was 117,991 oz. bullion, against 99,149 oz. in the corresponding period in 1902; an increase of 18,842 oz., or 19 per cent. The bullion reported this year was equal to 97,932 oz. fine gold, or $2,024,254.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—The ore shipments for the week ending July 25 were: Granby Mines, to Granby Smelter, 9,239 tons; Snowshoe, to Sunset and

Greenwood smelters, 1,770; Mother Lode, to Greenwood Smelter, 3,100; B. C. Mine, to Greenwood and Sunset smelters, 690; Emma, to Granby Smelter, 30; Oro Denoro, to Sunset Smelter, 330; Athelstan, to Sunset Smelter, 60; total for the week, 15,219 tons; for the year to date, 316,551 tons.

Golden Eagle.—An English syndicate is said to have an option on this property near Greenwood for $135,000.

Greenwood Smelter.—The 90-ft. steel smokestack was blown down recently. The lower half of the stack was not damaged, and will be put in place until the new brick stack is completed.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Crow's Nest Pass Coal Company.—A 3,000-light electric plant is to be installed at Morrissey for the town and the company's mines. J. D. McDonald, general superintendent of the West Kootenay Power and Light Company, with Thos. R. Stockett, Jr., general superintendent of the coal company, have been looking over the ground.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—The ore shipments for the week ending July 25 were: Le Roi, 4,860 tons; Centre Star, 1,620; War Eagle, 1,290; Kootenay, 351; Le Roi No. 2, 540; Velvet, 50; Giant, 23; Jumbo, 168; total for the week, 8,902; for the year to date, 208,992 tons.

BRITISH COLUMBIA—TEXADA ISLAND.

Cornell.—This Van Anda Mine recently shipped 300 tons to the Crofton Smelter. About 7,000 tons are reported on the dump.

Marble Bay.—A 75-h.p. hoist for this mine at Van Anda, Texada Island, is being installed. The mine will be shut down for a couple of weeks.

BRITISH COLUMBIA—VANCOUVER ISLAND.

A Vancouver journal announces the immediate exploitation of the Britannia mines at Howe Sound on a large scale, and adds that it is proposed to at once install a tram capable of conveying 2,000 tons daily from the mine to tidal water, a distance of 4 miles, while large smelting works in the vicinity of the property is also contemplated.

NORTHWEST TERRITORY.

International Coal and Coke Company.—This company recently made its first shipment of coal from its mines at Blairmore to Phoenix. About 25 men are employed, who mine two carloads of coal daily. The company is an auxiliary of the Granby Company, and is capitalized at $1,000,000.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—Work has been resumed in the No. 1 mine, which has been idle since it caught fire March 19. The workings were flooded, and unwatering of the mine has taken several months. The average output of the mine is about 40,000 tons per month.

Dominion Iron and Steel Company.—Orders were issued recently for reopening this company's works at Sidney. Sevent of the open-hearth furnaces are to start at once, and the blooming mill will put on two shifts.

Hub.—The water is nearly all out of this colliery at Glace Bay, and it is expected the mine will ship about Sept. 1. At the time the colliery closed it had an output of 900 tons a day.

CUBA.

Minas Manufacturing Company.—This concern was recently incorporated under the laws of Maine, with a capital of $5,000,000, to manufacture vitrified brick, sewer and drain pipes, near Havana. The company is reported to have acquired valuable clay deposits, and to have obtained a concession from the Cuban Republic, amounting to a monopoly.

MEXICO.

MEXICO.

El Oro Mining and Railway Company, Limited.—During June the stamps crushed 8,247 tons of ore, the estimated realizable value being $107,880; the cyanide plant gave $9,223, and the annual clean up $24,988. The working expenses, including development, were $53,249. The profit on the railway was $10,084, and the total profit was $99,425.

MINING STOCKS.

(Full quotations are given on pages 221 and 222.)

New York. Aug. 6.

To characterize the market as being dull and weak only emphasizes the fact that the bears are still in control, leaving no quarter to the bulls, whom the public usually follow. No wonder then that speculators have become weak kneed and sales are limited. Occasionally a large stockholder is forced to unload, but at the present low range of prices it seems preferable to await better times, especially if one has not bought on margin.

The copper shares have received another setback. Amalgamated, which is considered the leader, has come dangerously near to the low record, selling down to $38.25 on Tuesday. Simultaneously, Anaconda, which was featureless on Monday, changed hands at 69⅞ per cent ($17.47) a day later, showing a drop of $7.53 below par. Tennessee touched par and went to $27, but interest has been limited, owing to the weakness in other coppers. Greene Consolidated, of Mexico, was also uninteresting, selling at $19.50@$19.12½, and United, of Montana, at $16.75.

The gold and silver securities have fluctuated little, owing to the absence of news that might influence the market. Portland, of Cripple Creek, dropped to $1.10, Elkton sold at 45c., and Iron Silver, of Leadville, moved at $1.85. The Comstock shares were in light request. Consolidated California & Virginia brought $1.45; Mexican, $1.10@$1.05, and Hale & Norcross, 50c.

Boston. Aug. 4.

(From Our Special Correspondent.)

There seems to be a more confident feeling in mining shares, although it is not reflected in prices. Net changes during the week have been unimportant, except in a few cases, and there seems to be a disposition to break away from Amalgamated influences. This is noticeable in Copper Range, which has kept within a fraction of Amalgamated for many months. In the last dip of the latter to below $39, Copper Range only went to $40.50, and seemed to be in urgent demand on the decline. The Baltic Mine continues to increase its monthly output, that for July being 707 tons of mineral, or almost double that of a year ago. The Champion produced 734 tons of mineral.

It is felt that copper itself has steadied, and in some quarters a big sale of the metal is looked for shortly. This may be the turning point, but the disappointment would not be keen if the turn did not come, as holders of copper shares are quite used to rebuffs now.

Mohawk has been fairly active, and after advancing $2 to $37, reacted to $35.50. Centennial spurted $1 to $16, but reacted to $14.50. Osceola held strong at $52.25, but fell back to $50.12½. Daily rock shipments now exceed 3,300 tons. Parrot has shown a degree of strength, rising $1 to $19.50 on the assertion that there was equivalent to $10 in the treasury that will be distributed when the Heinze injunction is released. Subsequently the stock fell back to $18.

United States is off $1 for the week to $17. This company has wiped out its floating debt, and will cancel the bonded debt next month, except $100,000, which has been extended by request. The company expects to be working in full by September with all six furnaces in commission.

Shannon is off to $9.75. This company gives notice that $60,000 of the 7 per cent bonds—10 per cent of the total issue—have been canceled under the terms of the sinking fund. Tamarack sold at $90@$80. Rock shipments are about 2,000 tons per day, and conditions at the mine are now believed to show an improvement. Calumet & Hecla is $15 higher, at $430, and Quincy is selling at $85@$90.50. Quincy earnings are said to have been equal to $3.50 per share the first half of the year. Utah advanced $1.25 to $25.25, but fell back with the rest of the list. Wolverine has advanced $2 to $63.

Dominion Coal rose $6 to $96, but the brokers who bought it sold it down to $87. Dominion Iron and Steel, in the meantime settled $2.75 to $10. The directors of these two companies have agreed upon terms, on which the lease of the former to the latter shall be canceled. The Coal Company will be greatly benefited.

Colorado Springs. Aug. 6.

(From Our Special Correspondent.)

The labor situation is much more settled. In consequence of the improved conditions, the market has brightened.

The local mining stock market has been characterized all week by uncertainty, a good strong market ruling one day, to be followed the next by a stagnant one. Under such conditions but little progress could be made. The only feature of the week was Portland, which sold as low at $1.19½, rallying and closing to-day at $1.20. The decline was due to the action of the company leading the Morse group of claims, comprising 35 out of the company's 200 acres, but as this territory is far removed from all the great ore-bearing veins and further, as the leases extend to only a depth of 250 ft., it appears that more significance was attached to this new step than occasion warrants.

Elkton was featureless all week, selling around 40c. for small lots. El Paso sold up to 58c. this week, closing strong at 58 bid, with 59 asked. Isabella sold around 11c., with no new developments, and Moon-Anchor appeared, selling up to 8¼c. An annual statement is forthcoming in a few days from this company. Taken altogether, the outlook for next week is much brighter than has been the case for several weeks.

Salt Lake City. Aug. 1.

(From Our Special Correspondent.)

The total sales made on the Salt Lake Stock Exchange during the month of July amounted to 606,066 shares, bringing $299,082. During the last week in July sales were 141,566 shares, for which the sum of $86,409 was paid. The market has been slumpish during the week, closing, however, with indications more favorable than at the beginning. The Park City stocks are generally quoted lower; Daly West was particularly affected by the shrinkage in the eastern market. A strike of some importance in the Silver Shield Mine of Bingham sent that stock upward; it more than doubled in value. Consolidated Mercur has remained strong, ending a few points higher. Sacramento sold to the extent of 18,000 shares, at practically stationary figures. Century dropped to 35c. per share, but stiffened slightly towards the last. Wabash was started off at 21½c., but fell to 17c. Star Consolidated, Yankee Consolidated and Uncle Sam Consolidated, Tintic District stocks, all closed a few cents under the opening quotations. Lower Mammoth dropped 12c. a share, while Mammoth pulled through, showing a notable advance.

Stocks are generally low, and brokers expect better prices soon.

San Francisco. Aug. 1.

(From Our Special Correspondent.)

The market has been quiet and rather inclined to be weak, except for some of the North End stocks, which hold their prices pretty well.

Some quotations noted are: Consolidated California & Virginia, $1.45; Mexican, $1.05; Silver Hill, 81c.; Yellow Jacket, 68c.; Sierra Nevada, 55c.; Potosi, 22c.; Crown Point, 18c.; Jester, 13c.

On the San Francisco & Tonopah Exchange business was active and prices generally good. Montana-Tonopah sold up to $1; Tonopah North Star brought 55c.; Gypsy Queen, 27c.; Colehan, 16c.

In oil shares business was good and prices firm. Hanford brought $1.24; Sterling, $3.10; Home $2.90@$3; Esperanza, $1.10. There was some selling of the lower-priced shares, and those offered were freely taken up.

COAL TRADE REVIEW.

New York, Aug. 6.

ANTHRACITE.

The demand for anthracite, though falling off as consumers get their needs supplied, still continues strong enough to take the total output of prepared sizes. The steam sizes, however, are now in plentiful supply, and a considerable tonnage is being stored at railroad storage yards. The general outlook is for a good demand for prepared sizes through August. In spite of all talk from the anthracite regions about the miners being dissatisfied with the conciliation board and its methods, the fact remains that the board is handling and hearing many complaints and its findings, if not altogether satisfactory to the miners, are not likely to be seriously disputed. In fact, to reject the findings of the board would be to reject the awards of the Strike Commission, and leaders of the mine workers are not prepared to do that; at least, not this year. So it is fair to expect that production will not be interrupted to any extent by labor troubles.

Demand in the West continues active, though retail buying is naturally light. In Lake Superior territory arrivals are heavier than they were and docks at the head of the Lakes are being filled quite rapidly. The movement to interior points is as active as car supply permits. In Chicago territory the pressure for coal from dealers who had put in orders two months or so before was naturally strong during the last week in July, as they wished to get the July discount. Now that prices are but 10c. below the regular fall figure there is a little less urgency, although large dealers continue to take coal until their needs are supplied. All-rail points getting their coal from Chicago continue to call for more. Receipts at St. Louis are improving. Along the lower lakes, and in Canadian territory stocks as a rule are still light and a lot of coal will be needed yet. At Buffalo the market is easier. Along the Atlantic seaboard trade conditions vary greatly. At points beyond Cape Cod demand is still brisk; in fact, sales agents report that orders from beyond the Cape will keep them busy through August. At New York Harbor and in the all-rail trade quietness prevails and there will probably be little change for a month or more. The output of steam sizes is so liberal in proportion to the demand that prices are weak and there is little chance of immediate improvement. Certain grades of washery coal are going begging. A sale of buckwheat, f. o. b. New York Harbor, at 75c. is reported. The August prices for free-burning white ash coal, f. o. b. New York Harbor, are: Broken, $4.65; egg, stove and chestnut, $4.90.

BITUMINOUS.

In the Atlantic seaboard bituminous trade short car supply continues; particularly to mines shipping the higher grades of coal. The lower grade producers apparently can secure cars enough for all the coal the trade requires. Prices on these grades rule lower, now being around $2.50 and $2.60 f. o. b. New York Harbor shipping port for ordinary Clearfield. Such prices, with a $1.50 freight rate from the mines to tidewater and with miners' wages at the present high level, must in some cases leave little profit. Producers of the higher grades of coal are having much trouble in supplying their regular consignees.

Trade in the far east is calling for a fair amount of tonnage. Consumers in that region have been taking coal through the summer better than those in any other territory and still continued to take it. Along Long Island Sound consumers are pretty well supplied and few orders from that territory are reported. Strikes, the dullness in the textile trades and plenty of water for power all contribute to restrict demand. At New York Harbor trade is of fair volume, though not what it should be. In all-rail territory conditions remain unchanged, as one consignee shuts down on his orders another increases.

Transportation from the mines to tidewater is excellent, coal coming through in five or six days. Car supply at the mines is very variable, being down to nothing one day and up to 50 or 60 per cent of the demand the next. In the coastwise vessel market vessels are in good supply, but are holding off for higher rates. Probably, however, they will have to accept shippers' offers, as there is small chance of rates going up, with little coal at tidewater awaiting shipment. We quote current rates from Philadelphia as follows for larger vessels: Boston, Salem and Portland, 90 and 95c.; Portsmouth and Bath, 95c.; Lynn and Bangor, $1.10; Newburyport, $1.15; Sako, $1.15 @$1.20 and towages. Gardiner, $1.05@$1.10 and towages. Light draft vessels are asking $1.30 to Newburyport and Saco. From New York Harbor rates on craft of 1,000 tons or over are 80c. to Boston, and on smaller craft $1 and $1.10.

Birmingham. Aug. 3.

(From Our Special Correspondent.)

The differences between coal operators and miners in Alabama will be submitted to a board of arbitration and in accordance with an agreement the miners belonging to the United Mine Workers of America, in Alabama, who suspended work on July 1, have resumed. Some of the mines started up on Friday of the past week, others commencing on Saturday morning, but all of them are now in operation and the usual output will be secured. The board of arbitration which will decide the differences between operators and miners consists of the following: Charles McCrery, vice-president of the Tennessee Coal, Iron & Railroad Company, and R. H. Pearson, president of the Central Coal Company, for the operators; W. R. Fairley, Alabama member of the National Executive Board, and T. L. Lewis, vice-president of the National organization of the United Mine Workers of America, for the miners; Judge George Gray, of Delaware, fifth member, or umpire, of board. The board will meet August 10, in Birmingham, and will decide all matters in dispute.

There is a good demand for all the coal that can be mined right now in this State. The surplus stock of coal and coke which was on hand before the suspension of work began has been worked off almost entirely. At Pensacola, where shipping interests use much fuel from this district, considerable inconvenience has been experienced lately because of the short supply.

While the mines have been idle considerable repairing and improvement about the mines has been done. The output will be larger through these improvements from now on.

There is a good demand for coke, though prices are not so strong in this State as prevailed several months since. The output of coke in this State will be greatly increased also in the next few weeks, as three or four hundred new, or repaired, ovens are to be started up shortly.

Chicago. Aug. 3.

(From Our Special Correspondent.)

The demand for anthracite in the closing week of July has been exceedingly heavy, to take advantage of the July prices. The beginning of August shows a slight falling off, but not so great as was anticipated by many, if not most, dealers. The August price is $6.40 for stove, egg and chestnut, and the strong demand for egg continues. Though there will be a natural falling off in August, the pressure from the consumer continues so strong as to make sanguine dealers count on an uninterrupted brisk business up to the winter trade.

Bituminous trade is quiet but steady. Hocking is nominally at $3.25@$3.50, with the prospect of an advancement of 25c. from $3.75, nominal list price, to $4 nominal list price, during the month. Smokeless continues dull, at $3.75@$4; the demand for it will be small apparently until the end of autumn. Illinois and Indiana are at $2.10@2.50 for lump and egg. Youghiogheny is in fair demand at $3.25@$3.40. Indiana block is $2.90@$3. Throughout the West the threshing trade contiues as good as ever, if not better than in former years. Considered as a whole, the bituminous trade is remarkably good for the season.

Cleveland. Aug. 4.

(From Our Special Correspondent.)

The coal market in this territory is uncertain at present. Shippers have been talking of a scarcity of fuel, which they have laid at the door of the railroads. The latter have claimed that there are plenty of cars and say that the dealers are trying to force prices up by keeping the cars in the yards without being unloaded, thus creating a shortage of fuel. This situation is likely to result in the railroads assessing demurrage charges. Every effort is being made to prevent a possible advance in prices, which the coal producers are inclined to make. The domestic supply is ample for all uses, although at times manufacturers are temporarily hampered by scarcity.

The coke supply in the Valleys is fair. Prices have ruled strong and unchanged, although efforts have been made to bring down the quotations.

The lake situation has been unchanged, with rates holding well up. The shippers have been able to break down the hard coal rates slightly, on a single contract of 50,000 tons, the same going to the head of the lakes at 35c. from Buffalo, a decline of 5c. The general mild rates, however, have not been tampered with. The market has been active, shipments having been heavy. Rates of carriage on wild cargoes are 40c. to Duluth and 50c. to Milwaukee. No further sales of lake coal have been reported. Prices hold at $2.45 for Pennsylvania and West Virginia lump, and $2.35 for Ohio lump as a basis.

Pittsburg. Aug. 4.

(From Our Special Correspondent.)

Coal.—Nothing has been done in the way of river shipments, as the stage of water has been too low. The river mines are working full. Prices are well maintained as established for the season.

Connellsville Coke.—Standard Connellsville coke continues very firm; $3 is quoted for furnace, and $3.50 for foundry. Other grades of coke continue to be sold at lower prices, much of it claimed to be standard Connellsville. Thus a lot recently complained of, which had been sold as standard, with a guarantee of under 1 per cent sulphur, showed on analysis 1.89 per cent. For a fairly good grade of outside coke the market stands $2.25 for foundry and $2 for furnace. The *Courier* in its last weekly report gave the production for the previous week at 252,781 tons. Shipments were 11,809 cars, distributed as follows: To Pittsburg and river tipples, 4,321 cars; points west of Pittsburg, 5,342 cars; points east of Connellsville, 1,622 cars; showing a decrease of 231 cars in the total.

San Francisco. Aug. 1.

(From Our Special Correspondent.)

There is no change to report, except that arrivals of coast coals are somewhat better. Prices are steady.

Yard prices for Pacific Coast coal to dealers in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle, $6.50; Bryant, $6.50; Coos Bay, $4.50. Rocky Mountain coals in large lots, ex-car, are quoted at $14 for Colorado anthracite and $8.50 for Utah and Wyoming coals. Eastern coal is scarce, but quotations remain nominally at $14 for Pennsylvania anthracite and $13 for Cumberland in cargo lots. Foreign coal sells in large lots as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo and Wallsend, $7.50.

Foreign Coal Trade. Aug. 4.

Exports of coal and coke from the United States for the six months ending June 30 are reported by the Bureau of Statistics of the Treasury Department as follows, in tons:

	1902.	1903.	Changes.
Anthracite	604,322	1,084,998	I. 480,676
Bituminous	2,665,592	2,656,845	D. 8,747
Total coal	3,269,914	3,741,843	I. 471,929
Coke	218,375	205,922	D. 12,753
Totals	3,488,289	3,947,765	I. 459,476

The increase this year was wholly in anthracite. The coke exports were chiefly to Mexico. The distribution of the coal exported was as follows:

	1902.	1903.
Canada	2,258,530	2,875,061
Mexico	287,778	409,394
Cuba	223,673	203,943
Other West Indies	168,180	111,421
European countries	163,638	47,559
Totals	3,269,914	3,741,843

The increase was wholly in exports to Canada and Mexico. The exports to Europe have fallen this year to a very small quantity. This is due to the fact that there has been no surplus to spare for foreign trade.

Imports of coal into the United States for the six months ending June 30 are reported as follows:

	1902.	1903.	Changes.
Canada	804,963	916,597	I. 111,634
Mexico	7,611	5	D. 7,606
Great Britain	43,032	1,197,428	I. 1,154,396
Other Europe	668	356	D. 312
Japan	8,176	12,326	I. 4,150
Australia	158,065	129,633	D. 28,432
Other countries	274	1,019	I. 745
Totals	1,022,789	2,257,364	I. 1,234,595

Of the coal imported from Great Britain this year 174,822 tons were classed as anthracite. All the rest of the coal imported was bituminous. The increases in imports this year were wholly at Atlantic ports. These imports are now nearly at an end, the receipts in June having been light.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date of July 25 that a strong and steady tone continues throughout the Welsh coal market. Quotations are: Best Welsh steam coal, $3.90@$3.96; seconds, $3.78; thirds, $3.60; dry coals, $3.30; best Monmouthshire, $3.36@$3.48; seconds, $3.30; best small steam coal, $2.16; seconds, $2.64; other sorts, $1.92.

The above prices for Cardiff coals are f. o. b. Cardiff, Penarth or Barry, while those for Monmouthsire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days less 2½ per cent discount.

Outward chartering has been considerably more active during the past few days, but rates of freight continue very weak. Some rates named from Cardiff are: Marseilles, $1.20; Genoa, $1.20; Naples, $1.20; Singapore, $2.52; Las Palmas, $1.50; St. Vincent, $1.52; Rio Janeiro, $2.28; Santos, $2.70; Buenos Ayres, $1.98.

IRON TRADE REVIEW.

New York, Aug. 5.

The iron market continues to be essentially a waiting one. Conditions have changed very little, the only exception being some improvement in buying of foundry and gray forge in Pittsburg. This appears, however, to have been prompted by the immediate necessities of consumers, as all the purchases were for August and September deliveries, and no fourth-quarter contracts have been made. The bessemer market has been flat, a few sales only being reported. It is understood that the United States Steel Corporation is a little short on third-quarter iron and may make a purchase next week from some of the outside furnaces.

In finished material business continues dull and consumers are buying only in a small way. Concessions are reported, especially in merchant steel and bars, where good orders are in prospect. Plates have already been cut to the bone, and the sellers say that no further concessions are possible. Buyers, however, have their own opinion about that, and are still holding back. The new billet agreement seems to be working well and a little more business is reported. Upon the whole, however, the market does not seem to be encouraging, and there is no doubt that buyers have made up their mind to a lower range of prices, and will not come forward freely until it begins to look as if such quotations had been secured.

Production continues large, however, and mills and furnaces are generally running full. The Alabama furnaces were beginning to feel the scarcity of fuel and several had been banked; but the resumption of work in the coal mines under the arbitration agreement will remove this difficulty.

The expected has happened, and Mr. Charles M. Schwab has finally resigned the position of president of the United States Steel Corporation, from the duties of which he was practically relieved some time ago. The reason given is his continued ill-health; but it has been felt for some time that his withdrawal was inevitable. It is not necessary here to go into the unfortunate causes. Mr. W. E. Corey, who was recently appointed assistant to the president, succeeds Mr. Schwab as president of the corporation. It is understood that Mr. Corey's duties will be confined to the technical direction of affairs, which is surely enough work for any one man. The financial direction will rest probably with the chairman of the executive or finance committee, though possibly a new position may be made for this purpose. Mr. Corey is known as a quiet but efficient man who is thoroughly acquainted with his duties. Mr. Schwab continues a director of the company. It is said that Mr. A. C. Dinkey, who is now superintendent of the Edgar Thomson Steel Works, will succeed Mr. Corey in the immediate direction of the Carnegie plants.

Birmingham. Aug. 3.

(*From Our Special Correspondent.*)

While there is a little improvement to be noted this week in the southern pig iron market conditions, it must be admitted that the buying is far from what it should be. The orders are a little more numerous, but they are for such small lots that the aggregate is not equal to the make. Rumors prevailed during the past few days that the Southern Furnace Association was about to crumble; in fact, a statement was heard that one of the companies had withdrawn entirely. This was not denied. It was also rumored that one of the larger companies was about to withdraw and was about to go on the market to sell at any price. This was denied. That the Association is not faring well is true, but furnacemen say that there has been no rate cutting and the Chicago prices are still being maintained. The production of iron was a little off during the past week, caused by the shortness of the coal and coke supplies. The Woodward Iron Company, one of the independent companies, is said to have been compelled to close down its furnaces pending some improvement in the coal and coke supplies. The Sloss-Sheffield Steel & Iron Company has one furnace banked and another out for repairs. The Tennessee Coal, Iron & Railroad Company had a furnace or two banked.

As to quotations, it is asserted, and there is no proof to the contrary, the prices fixed at Chicago are being maintained. Some talk was to be heard of No. 3 foundry at $12, but inquiry failed to discover much, if any, going at this price. The following quotations are given: No. 1 foundry, $14; No. 2 foundry, $13.50; No. 3 foundry, $13; No. 4 foundry, $12.50, gray forge, $12 to $12.50; No. 1 soft, $14; No. 2 soft, $13.50.

To demonstrate that there is no cutting on the part of the larger concerns in the Southern Furnace Association, the correspondent happened to be in one of the offices of the sales agent of a large iron manufacturing company when a local foundry made inquiry for iron. No. 2 soft was desired, and an order for 50 tons was offered. Delivery was wanted that very day. The delivery could be made by wagon, and with considerable talking, a price of $13.60 per ton was made, 10c. per ton for delivery being charged.

Chicago. Aug. 3.

(*From Our Special Correspondent.*)

Stagnation in the pig-iron market continues. Purchases are perhaps increasing in number, but decreasing in size, so that the net result is about the same. It is a hand-to-mouth business; nobody is buying beyond immediate necessities and everybody wants his iron the day after he buys it. What iron is selling for it is difficult to determine; probably $12 Birmingham or $16.35 Chicago represents the price of most sales of Southern, the $13.50 Birmingham price established by the Southern Association apparently having no effect on the market whatever. There is no cloud of relief in the sky, so far as the authorities of the trade here can see; it is a condition that apparently has come to stay for an indefinite period. No one in the trade sees any prospect of anything like the business or the prices for the rest of the year that prevailed in the latter part of 1902.

Coke is abundant and buying is light. Spot coke continues about the $5 mark; contract coke is $5.50 @$6.

Cleveland. Aug. 4.

(*From Our Special Correspondent.*)

Iron Ore.—The demand for ore has ceased and it is hardly likely that any further sales will be made for 30 days. The market is dull at the old prices—$4.50 for bessemer old range, and $4 for bessemer Mesabi. The delays to lake boats are still serious, and the movement of ore delayed. It is expected that this tying up of boats will have curtailed the movement of ore during the month of July by 100,000 tons. The reports have not yet been compiled. The supply of boats at the head of the lakes has slightly increased and the conditions are more favorable for the shippers, therefore preventing any advance in rates. The carrying charges are: 80c. from Duluth, 70c. from Marquette, and 60c. from Escanaba.

Pig Iron.—The demand for foundry is confined to small lots, no big orders having been obtained. Valley furnaces are selling No. 2 foundry at $17.50 in the Valley and this price is being met by Southern Ohio furnaces. Southern furnaces belonging to the association are still holding for $13.50 Birmingham, while talk of the non-association stacks cutting to $12 is persistent. This is effecting a gradual change in the demand upon the Northern furnaces. Bessemer furnaces are not looking for new business for the present, because they fear that any forcing of the market would bring about a break, which might not be gratifying. Very little is being done. The price holds nominally at $18.50 in the Valley. Basic producers have sold nothing of late, and do not expect to make a sale for 30 days. The stacks have caught up on their old contracts, but have enough new ones to keep them busy for some months to come. Production in all lines is heavy, but the consumption equals it.

Finished Material.—The sheet trade is the strongest part of the market. Orders are small, but steady, and the business is generally good. Rumors of price reduction have been abroad, but have not been confirmed. Prices have remained unchanged, being based on a quotation of 3.05c. for No. 27 black sheets out of stock and 4c. for No. 27 galvanized sheets out of stock. Bars are dull and the market weak. The talk of reductions in prices in bar steel has been general, and in fact the consumers are beginning to demand it. The trade is waiting for the reduction. The prices hold nominally on steel at 1.60c. Pittsburg for bessemer and 1.70c. Pittsburg for open-hearth. On bar iron local conditions are being met at the various centers. Here the price has been lowered and 1.60@1.65c. Cleveland is being quoted quite generally. Some mills are still quoting 1.70c. Youngstown, but, of course, are getting no business. The plate trade is weak, with no order booking being done, and only small lots being taken now and then. The mills have enough to keep them running, and are not piling any steel, but contracting is light. About any delivery wanted is now possible. The market is weak at 1.60c., with no premiums possible. The structural trade has been light and the market easy. All mills are looking for business, but without appreciable success. Labor difficulties have been playing havoc with this trade. The business for this year will have to wait, as few new enterprises, if any, will be started. Very little billet business has been created by the reduction in prices. The quotations hold at $27 Pittsburg for bessemer 4 x 4.

Old Material.—The market has been slightly improved, some inquiries coming in for material; but no transactions have been reported.

New York. Aug. 6.

Pig Iron.—The market continues dull and prospects are not bright for immediate improvement. For Northern iron at tdidewater prices are: No. IX foundry, $18.25@$18.25; No. 2X, $17.25@17.75, while No. 2 plain can be had for 50c. less; gray forge, $16.75@$17.25. For Southern iron, on dock, quotations are: No. 1 foundry, $18.25; No. 2, $17.75; No. 3, $17.25; No. 1 soft, $18.00.

Bar Iron and Steel.—Prices for large lots on dock are: Refined bars, 1.80@1.90c.; soft steel bars, 1.75 @1.90. Trade is chiefly of a retail order.

Plates.—A fair number of small orders are received from local users, but large orders are scarce. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.80@2c.; flange, 2@2.05c.; marine, 2.10 @2.20c.

Steel Rails.—The quotation remains $28 for standard sections, f. o. b. mills; light rails, $33@36c, according to weight. Relaying rails are $28@$39 for heavy sections and $33@$35 for light sections. Demand for rail-fastenings is good.

Structural Material.—The continued tie-up of building operations affects local buying. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. The usual advance is asked for small lots out of stock.

Philadelphia. Aug. 6.

(*From Our Special Correspondent.*)

Pig Iron.—The demand for pig iron is of a hand-to-mouth character, notwithstanding a few transactions of considerable magnitude. A few large consumers have found it advisable to place orders for large lots of No. 2 foundry; a few mills have bought considerable forge; one or two orders for basic pig have been placed; but, apart from these few large transactions, the market has been devoid of interest. As far as our local demand is concerned, most consumers are willing to buy in a hand-to-mouth way, and await developments, but there is a somewhat stronger tone than there was a week ago after the recent drop. Sales of No. 2X foundry have been made within 24 hours at $18; for No. 2 plain, $17; standard gray forge, $17@$17.50; ordinary gray forge, $16.75, and basic $17.25, but sales have been made at still lower prices.

Billets.—Business in billets shows some signs of improvement; there are a number of inquiries in the market, but up to present writing nothing of serious importance has been done. Makers are holding at $29 for ordinary basic, and will not sell under that; bessemer is quoted as low as $28.25, and some business has been done at this figure.

Merchant Bar.—The merchant bar iron is very dull and prices are weakening. There are rumors of another cut, and it is probable that a further break in prices may take place. Steel bars are quoted as low as 1.65, at which price business is being done. Merchant bars are 1.60c. in a large way and 1.70@1.80c. in a small way.

Merchant Steel.—The market is without any particular activity, as is usual in midsummer. There are a great many requirements to be filled, so the agents say, and they have done their best to bring the large consumers to them, but the latter still hold out, and are unwilling to buy more than needed quantities on account of the uncertainty as to the course of prices during the fall months.

Skelp Iron.—Very little business has been done in skelp, and prices remain about where they were.

Structural Material.—There is very little business coming to hand, although we hear rumors of large transactions that are hanging along the borders of the market. This statement is quite correct, but for some reason or other large buyers are awaiting developments. Beams, angles and channels are quoted at 1.73½@1.80c. in large lots.

Steel Rails.—There are no further developments in steel rails. Light rails range from $32 to $40, according to size. There are also some inquiries on the market to-day for girder rails, which will likely result in business very soon.

Old Rails.—Old steel rails are very dull at $19 @$19.25; old rails are quoted at $20.50@$21.

Scrap.—There is more inquiry for scrap, but no improvement as against one or two weeks ago. Heavy steel scrap is held at $19, and $18.50 is offered. Low phosphorus scrap is held at $27, with $26 offered. Old car-wheels are quoted at $21; railroad scrap is worth $19; country scrap, $17.50; machinery scrap, $17.25. The scrap people say they will be able to get rid of all the stock they have on hand in a very short time.

Pittsburg. Aug. 4.

(*From Our Special Correspondent.*)

The iron trade shows a marked improvement. The pig iron market is much steadier, several lots of bessemer pig which were bearing down on the market having been absorbed, while some good buying is expected shortly. Forge pig, which has been absolutely dead for nearly two months, is coming to the front with inquiries for early shipment. Foundry pig is moving still more freely, and inquiries are for larger tonnages. The steel billet agreement has been absolutely observed, according to the flat statement of the heads of several concerns, and inquiry this week is large.

Finished lines generally are in a trifle better shape. The merchant steel bar mills, at a meeting in this city, decided to guarantee all prices in the future, and this has had an excellent effect, orders this week showing a marked improvement, although the concession is purely a nominal one, since the mills would not in any case have forced on a customer any tonnage he did not want to take. Structural shapes have looked up a little. Wire, sheets, tin-plates and merchant pipe were all beginning to get weak at this time last year, while at this time all these products are absolutely firm. Tin and pipe mills are sold far ahead and premiums on the former product have not absolutely disappeared.

The wage scale for molders in the Pittsburg district was finally settled last week, all men now employed getting an advance of 10c. a day. The minimum wage is left at $3, so that new men employed do not participate in the advance. The settlement affects the associated manufacturers, employing some 1,500 out of 2,500 men in the district, but no trouble is expected at independent foundries. The machinists in this district were recently given a 7½ per cent advance. There has been a small strike at the Westinghouse Machine Company's plant, which does not recognize the union, but the majority of men have remained at work.

Pig Iron.—The bessemer pig market is in much firmer shape. Several odd lots, referred to in previous reports, which were offered at concessions, have been absorbed, and the market is in control of the Valley furnaces, which are quoting $18.25@$18.50 at furnace, equal to $19.10@$19.35, Pittsburg. It is possible that one or two might do at $18 at furnace on a very desirable tonnage, but this is now the absolute minimum. Direct sales of bessemer pig in this district in July were between 15,000 and 20,000 tons, besides a fair tonnage which went out subject to price adjustment at the end of the month. There has been no heavy buying, as some steel works were shut down for repairs and others had enough iron to run them. The market this month will be much more active. Nearly 15,000 tons have already been sold this month at $18.85, Pittsburg, although none of the large steel works have yet bought. The United States Steel Corporation's pig iron committee will meet Monday, August 10, to consider buying more iron for August and September, of which the corporation seems to stand in need, and possibly also some fourth-quarter iron. The forge pig market, which has been absolutely stagnant, has been revived by an inquiry for 2,000 tons for August shipment to a local consumer. There has been very active bidding, but no furnace has quoted low enough to meet buyers' views, which are $16 delivered, and these views may have to be modified. Open, quotations are around

$16.50, Pittsburg. Buying of foundry iron continues on a slightly broader scale, and inquiries now coming in are for larger lots and more extended delivery than a week or two ago. On a good sized lot $17.50, Pittsburg, can be done for Northern No. 2, while on small lots close to $18 is paid. We note a sale of 50 tons at $17.90.

Steel.—The billet arrangement is working smoothly. Meetings three times a week are held in the office of W. H. Vilas, the commissioner, and all sales and inquiries are reported. It is positively stated that not a single sale has been made below the agreed prices. Several moderate sized lots have been sold, from 1,000 to 3,000 tons. Reports of large lots sold are erroneous, and refer to some transactions before the agreement was made. We quote bessemer 4x4 billets at $27, f. o. b. Pittsburg, Wheeling or Valley mill; open-hearth billets, $1 extra; sheet bars and small billets, $1 extra, with extras for cutting and for high carbons.

Sheets.—Mill business has not been very heavy, simply because tonnage is not being placed far ahead. The actual movement week by week is quite satisfactory. The official price is 2¾c. for No. 28 gauge. The leading interest is making a concession of 5c. per 100 lb. to a few special customers, and some independents are making the same price, but this has been the case for several weeks, and the market is in fully as strong a condition as a fortnight ago. On galvanized sheets the leading interest quotes 3.85c. net for No. 28 gauge, and makes concessions of 5c. to very large customers. Independents are quoting 75, 10 and 2½ per cent off list.

Ferro-manganese.—English ferro is a shade easier, and on large lots it is now possible to do $49 for 80 per cent, delivered east of the Mississippi. Ordinary small lots are quoted $51.50 to $52.

Cartagena, Spain. July 18.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Shipments for the week included three cargoes, 9,000 tons dry ore, to Great Britain, one cargo, 1,900 tons manganiferous ore, to Great Britain, and one cargo, 2,200 tons manganiferous ore, to Marseilles. The iron ore trade continues quiet, prices being steady but rather dull, with few sales reported. Several vessels, which have been detained at Barcelona by the dock strike there, were expected to be released about this date and should be here next week for cargoes, which will improve matters.

Prices are firm at 6@7s. per ton f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites 40 per cent iron and 43 per cent sulphur are quoted at 10s. 6d. per ton, f. o. b. Cartagena. No shipments reported for the week.

CHEMICALS AND MINERALS.

(See also Prices-Current, Page 224.)

New York, Aug. 6.

While the trade is resting and consumers are thinking about future contracts, manufacturers and importers are calculating how best to improve market prices. Heavy chemical manufacturers are especially desirous of bettering their position, but unfortunately competition is too keen to permit a realization of any sanguine expectation which they may hold. Perhaps an increased consumption and a curtailment of production, particularly of bleaching powder, will rectify the situation, but even such hope is dismal. To the initiated no improvement need be looked for until manufacturers adjust their differences in some way that will allow them to ask more money for their goods.

The American chemical industry is expanding, and by introducing the latest economical methods, manufacturers are obtaining profits that have heretofore been impossible. An advance step is the acquisition of an independent supply of raw materials. It is also evident that manufacturers of specialties find it advantageous to consolidate, judging from the recent amalgamations, particularly in the Central West. The latest incident of this kind is the purchase of the chemical works (excepting the ammonia plant) of the Herf & Freriche Chemical Company, of St. Louis, Mo., by Merck & Co., of New York. In some instances, however, consolidation has proved a failure. An example of overcapitalization and injudicious management is the National Salt Company, which, after passing into the hands of receivers, has been compelled to offer its plant and properties at public auction at Ithaca, N. Y., on September 15. An unsatisfactory salt market is given as the reason for this action. In contrast to this, it is interesting, to show the business policy of a combination, owning property in the United States, Mexico and Germany. We cite the Virginia-Carolina Chemical Company, the Southern fertilizer combination. In the fiscal year ended June 15, 1903, the investments in other companies, plants, pyrites, phosphate mines, etc., had been increased fully 15 per cent over the previous year. Dividends of 5 per cent per annum have been paid on the common stock and 8 per cent on the preferred, and the undivided profits are estimated at $4,665,534, which is equal to nearly 12 per cent on the issued capital stock. The magnitude of the company's business is shown by the increase of 26.26 per cent to 983,634 tons fertilizers marketed in the past fiscal year. This has necessitated an increase of fully 33 1-3 per cent in the productive capacity of the various plants.

Import trade is quiet. In June and the half-year the United States imports included the following, in pounds, unless stated otherwise:

	June.	Jan.-June.
Chlorate of potash	29,483	223,051
Muriate of potash	14,020,924	53,491,424
Saltpeter	1,118,564	7,564,435
All other potash	7,107,540	29,865,886
Caustic soda	195,535	1,443,958
Sal. soda	309,300	1,816,583
Soda ash	2,035,557	11,525,769
All other than nitrate of soda	1,056,967	9,225,515
Asphalt, tons	20,521	44,538
Cement	104,153,846	497,842,869
Graphite, tons	1,603	10,061
Salt	34,602,943	150,510,862

Great Britain and Germany furnished the bulk of these importations.

Cyanide of Potassium.—Importers continue to quote on the basis of 20c. per lb. for wholesale quantities, but as orders are not plentiful, a large consumer can doubtless shade this price. In fact, shipments are being made from Great Britain to the United States on the bass of a fraction under 19c., while sellers quote f. o. b. United Kingdom ports at 8½d. (17c.). Practically the same may be said of German cyanide.

Bleaching Powder.—No difficulty would be experienced in buying good test bleaching powder at $1 per 100 lbs., f. o. b. New York, and some of the best foreign brands could doubtless be had around $1.15. The trick is to find a buyer. Momentarily booking for future delivery is in abeyance, as importers and domestic producers are not inclined to accept the present low prices. Considering the condition of the industry, its heavy production and keen competition, it would seem judicious to accept small profit on large sales than to await better prices and in the interval allow a competitor to get the bulk of the business. Of course, this is a matter of individual judgment, though there is reason to believe that the electrolytic people will show a strong fight for an order when it appears. We are still importing a large quantity of bleaching powder, particularly from Great Britain and Germany. In June and the half-year the imports into the United States were as follows:

	June.	Jan.-June.
Bleaching powder	8,023,914	58,371,197
Chlorine content	2,808,335	20,429,919

Compared with the corresponding half-year in 1902, there is a decrease of about 7 per cent, chiefly in imports from Germany.

Copper Sulphate.—Some sellers ask up to $4.75 per 100 lbs., f. o. b. New York, while others would gladly accept $4.62½, and it is intimated that a fraction less could be done. Of course, those consumers who are acquainted with the situation of the market, particularly the drooping export trade, known too well that if they offer a large order they would find no difficulty in receiving an advantageous price. At one time the price for copper sulphate was influenced entirely by the market value of copper, but in recent years, with the concentration of the trade, the situation has changed somewhat. Proof of this may be found in the fact that the fluctuations of late in the price of copper sulphate have not been as wide as those for the metal. Exports are considerably less than February or March, and no improvement is looked for during the next few months. In June the exports from the United States amounted to only 510 long tons, making a total for the half-year of 7,445 tons, which is 5,511 tons, or 42.5 per cent, less than 1902. The three leading buyers were Italy, Austria and Argentina, which use copper sulphate as an insecticide for the vineyards.

Acids.—Trade is moderately active, and prices, with the exception of oxalic acid, are unchanged. Oxalic is pressed for sale, and $5@$5⅛ per 100 lbs. can be obtained.

We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l	$5.00@$5.12½
Muriatic, 20°	1.60	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	Sulphuric, 60°, bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—Best unmixed seconds on spot can be had at $22.50@$22.75 per ton, while shipments are offered at $22@$22.25. Best thirds are about $1 less than seconds, but business is limited. In June the United States imported 13,004 tons, making a total for the half year of 98,475 tons, which compares with 89,914 tons in the corresponding period in 1902, showing a decrease of 8,561 tons.

Exports of brimstone from Sicily in June were 34,951 long tons, making a total of 484,850 tons for the fiscal year ended June 30, 1903, which compares with 437,977 tons in the previous year. The increase of 46,873 tons, or 10.7 per cent, may be explained as follows:

Exports to—	1901-1902.	1902-1903.	Changes.
United States	166,403	165,242	D. 1,161
France	56,973	73,451	I. 16,478
Italy	54,249	43,590	D. 10,659
Germany	20,791	31,131	I. 10,340
Other countries	139,561	171,436	I. 31,875
Total, tons	437,977	484,850	I. 46,873

Of the total exports the United States received about 34 per cent.

Stocks at Sicilian seaports on June 30, 1903, amounted to 287,878 tons, as against 276,589 tons in 1902 and 183,086 tons in 1901.

Pyrites.—Conditions remain favorable to sellers, and considering the volume of deliveries consumers show no dissatisfaction with prices. The demand this year is enormous, and as prices have changed little so far profits must be satisfactory. Fortunately sellers have long time contracts with acid makers, and can take advantage of any fluctuation in freight rates. In June the imports into the United States amounted to 25,247 long tons, making a total for the half-year of 199,897 tons, as against 217,394 tons in 1902, showing a decrease of 17,497 tons. The sulphur content of this year's imports was approximately 93,952 tons.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and $10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—The increased consumption, coupled with the fixing of the exports at 32,500,000 qtls. for the third combination year ending March 31, 1904, have caused a material strengthening in the market. At New York importers ask $2.05 per 100 for spot goods and $2.02½ for futures. Ocean freight rates continue firm at 20s. ($4.80).

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, Aug. 1, gives the following interesting statistics:

Imp. into Atlantic ports from West S. A. from Jan. 1, 1903, to date	1903. Tons. 126,126	1902. Tons. 84,660	1901. Tons. 109,104
From Europe	.....	....	.....
	126,126	84,660	109,104
Stock in store and afloat Aug. 1, 1903, in New York	2,000	526	5,936
Boston	.....	....	133
Philadelphia	.....	2,660	.....
Baltimore	1,400	....	8,290
Charleston	.....	3,573	.....
To arrive, due Nov. 15, 1903	78,500	67,725	51,192
Visible supply to Nov. 15, 1903	81,900	74,484	65,551
Stock on hand Jan. 1, 1903	7,800	10,000	1,793
Deliveries past month	21,629	14,640	11,507
Deliveries since Jan. 1 to date	130,526	88,231	96,537
Total yearly deliveries	.....	179,613	175,176
Prices current, Aug. 1	2.05c	1.90c	1.90c

A noteworthy feature is the increase of 42,295 tons in deliveries in the seven months ending July 31, as compared with last year.

Sulphate of Ammonia.—Good gas liquor is quoted at $3.12 per 100 lbs. on spot, and $3.05 for shipment. Business is exceptionally quiet.

Phosphates.—In another month buying will commence in earnest. Then the superphosphate manufacturers who have been holding off for lower prices will find the market particularly strong. In the meantime, exporters are exercising some caution in chartering vessel room, and are booking at private terms to European ports.

At producing centers work is active, although trouble about labor is being experienced at Mt. Pleasant, Tenn. Exports of Tennessee rock through Pensacola amounted to 13,846 tons in June, making a total for the half year of 57,838 tons.

Shipments of Florida phosphates for June and the half year were as follows:

	June.	Jan.-June.
High-grade rock	29,555	230,140
Land pebble	34,950	142,231
Peace River pebble	19,170	29,015
Total	83,675	401,386
Total, 1902	75,629	384,509
Increase, 1903	8,046	16,877

The increase is credited to the exports of high grade rock. Of the total shipments this year 299,131 tons, or 74.5 per cent., were destined to foreign markets, principally to Germany.

In foreign producing territory miners are busy, especially in Africa, and prices are strengthening.

In June the shipments of Algerian phosphates from Bone amounted to 22,346 metric tons, making a total of 146,381 tons for the half year, most of which went to Italy and France.

Completed statistics give the exports of Damaraland guano from Cape Cross in 1902 at 7,362 tons, which is 917 tons less than 1901. This guano analyzed from 5.78 to 6.64 per cent ammonia, and from 26.045 to 32.43 per cent phosphoric acid, and was imported by Belgium, Germany and Great Britain.

Phosphates.	Per ton. F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn. (78@82%) export	4.00@ 4.25	6½@7d.	10.40@ 8.05
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	...@ 3.25	.....	.....
‡So. Car. riv. r'k (55@66%)	2.75@ 3.00	5½@5¾d.	5.95@ 6.53
Algerian (63@70%)	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Gafsa ,Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80@85%)	.....	7¼@7¾d.	12.04@12.87

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis. †Mt. Pleasant. ‡On vessels, Ashley River.

METAL MARKET.

New York, Aug. 6.

Gold and Silver Exports and Imports,

At all United States Ports in June and Year.

Metal	June. 1902.	June. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$391,525	$12,507,588	$20,276,237	$31,327,483
Imports	4,086,457	4,767,553	13,187,344	15,368,199
Excess	E. $3,694,932	E. $7,740,035	E. $7,088,893	E. 15,959,284
Silver:				
Exports	$3,250,066	$1,551,410	$22,528,034	$17,426,973
Imports	1,802,853	2,050,805	12,220,738	10,340,798
Excess	E. $1,447,213	E. $499,395	E.$10,307,296	$7,086,175

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending August 5, and for the years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week	.....	$31,379	$268,380	$79,394	E. $157,907
1903	$2,161,549	3,613,399	12,240,652	1,254,294	E. 39,533,508
1902	24,004,088	1,142,169	15,022,990	775,091	E. 36,809,818
1901	27,786,523	1,730,726	18,917,324	2,289,468	E. 40,677,653

There were no gold exports this week; the silver went to London. Imports were chiefly from Central and South America and Mexico.

The stock markets continue uncertain, with a weaker tendency still manifest. General business, however, is but slightly affected and conditions are everywhere reported good. No gold exports have been made this week. Money is not in free supply, and there has been some curtailment by the banks, especially in speculative loans.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending August 1, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$878,506,900	$919,671,600	$908,864,500
Deposits	955,912,200	957,145,500	909,857,700
Circulation	30,512,800	32,184,100	43,862,600
Specie	180,545,700	173,443,900	170,738,300
Legal tenders	80,597,700	79,580,600	80,786,200
Total reserve	$261,143,400	$253,024,500	$251,524,500
Legal requirements	238,978,050	239,286,375	227,464,425
Balance, surplus	$22,165,350	$13,738,125	$24,060,075

Changes for the week this year were increases of $964,800 in loans and discounts, $7,480,900 in deposits, $43,400 in circulation, $4,371,200 in specie, $2,643,700 in legal tenders, and $5,144,675 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$173,443,900	.....	$170,738,300	.....
England	189,621,330	.....	180,291,355	.....
France	518,154,440	$224,403,120	512,342,050	$225,122,680
Germany	186,345,000	68,945,000	177,740,000	64,950,000
Spain	70,995,000	97,995,000	72,920,000	102,340,000
Netherlands	24,247,500	33,580,500	19,702,000	32,602,000
Belgium	15,373,335	7,686,665	14,703,335	7,351,665
Italy	80,980,000	10,207,000	80,980,000	10,207,000
Russia	371,495,000	44,400,000	406,720,000	44,890,000
Austria-Hung.	220,400,000	63,375,000	226,790,000	65,330,000

The returns of the Associated Banks of New York are of date August 1, and the others July 30, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has continued firm and dull, but closes strong at an advance to 25½d. on account of a French tender.

The United States Assay Office in New York reports receipts of 47,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 23 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£3,703,945	£3,493,525	D. £210,420
China	86,910	235,993	I. 149,083
The Straits	70,550	499,729	I. 429,179
Total	£3,861,405	£4,229,247	I. £367,842

Receipts for the week were £4,000 in bar silver from the West Indies, £24,800 from New York and £22,600 from Australia; total, £51,400. Shipments were £146,000 in bar silver to Bombay and £1,300 to Port Said; total, £147,300.

Indian exchange has been somewhat firmer, and the demand for Council bills was better. All the bills offered in London were taken at an average of 16d. per rupee. There was a considerable demand for silver, both for Indian and Chinese account.

The coinage executed at the mints of the United States in July is reported by the Bureau of the Mint, Treasury Department, as below:

Denominations.	Pieces.	Value.
Quarters	649,309	$162,327.25
Dimes	1,750,000	175,000.00
Total silver	2,399,309	$337,327.25
One-cent bronze	3,331,000	33,310.00
Total minor	3,331,000	$33,310.00
Total coinage	5,730,309	$370,637.25

There was no gold coined during the month.

The coinage for the Philippines was as follows: Pesos, 1,434,112 pieces; 5-centavos, 3,205,000; 1-c., 2,980,000; ½-c., 4,450,000; total, 12,069,112 pieces.

The Treasury Department's estimate of the amount and kinds of money in the United States on August 1 is as follows:

	Total.	In Treasury.	In circulation.
Gold coin (includ. bullion in Treasury)	$1,255,749,068	$248,499,879	$620,879,790
Gold certificates	.....	.....	386,369,399
Silver dollars	555,428,503	27,966,217	72,568,354
Silver certificates	.....	.....	454,893,932
Subsidiary silver	101,679,100	9,432,720	92,246,380
Treasury notes of 1890	18,556,000	88,422	18,467,578
U. S. notes	346,681,016	11,485,451	335,195,565
Currency certificates	.....	.....	.....
National bank notes	417,346,487	15,948,987	401,397,500
Total	$2,695,440,174	$313,421,676	$2,382,018,498

Population of the United States August 1, 1903, estimated at 80,602,000; circulation per capita, $29.55. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the government. This statement of money held in the Treasury as assets of the government does not include deposits of public money in national bank depositaries, to the credit of the Treasurer of the United States, and amounting to $144,046,821. The total amount in circulation August 1 shows an increase of $5,695,288 over July 1, and an increase of $21,412,361 over August 1, 1902.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.42½	$0.44
Peruvian soles and Chinese pesos	.39	.42
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	4.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

July-Aug.	Sterling Exchange.	Silver N. Y. Cts.	Silver London Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton.	Copper Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter N. Y., Cts. per lb.	Spelter St. Louis, Cts. per lb.
30	4.86	54⅝	25¼	12¾@13	12⅝@12⅞	57	29	4.05@4.10	5.62½@5.67½	5.45@5.55
31	4.86	54¾	25 1/16	12¾@13	12⅝@12⅞	57¼	28¾	4.05@4.10	5.62½@5.67½	5.45@5.55
1	4.85¾	54¾	25 1/16	12¾@13	12⅝@12⅞	....	28⅝	4.05@4.10	5.65@5.70	5.47½@5.52½
3	4.85⅝	54¾	....	12¾@13	12⅝@12⅞	....	28⅝	4.05@4.10	5.65@5.70	5.47½@5.52½
4	4.85⅝	54¾	25 1/16	12¾@13	12⅝@12⅞	58	28¾@28½	4.05@4.10	5.65@5.70	5.47½@5.52½
5	4.85⅝	55⅛	25¼	12¾@13	12⅝@12⅞	57⅛	28¾@28¾	4.05@4.10	5.65@5.70	5.47½@5.52½

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper has been very firm throughout the week and prices have been well maintained. Consumption is reported quite satisfactory in all branches. The closing quotations are given as 12¾@13c. for Lake, 12⅝@12⅞c. for electrolytic in cakes, wirebars and ingots, 12⅝@12⅝c. in cathodes, 12¼@12½c. for casting copper.

The market for standard copper in London, which closed last week at £57 5s., advanced on Tuesday to £58, but the closing quotations on Wednesday are cabled at £57 2s. 6d.@£57 5s. for spot, £55 2s. 6d.@£55 5s. for three months.

Statistics for the second half of July show a decrease in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £60@£60 10s.; best selected, £60 10s.@£61; strong sheets, £69@£70; India sheets, £66@£67; yellow metal, 6¼@6⅜d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week of August 4 and for the year to date were, in long tons:

Exports—	Week.	Year.
Austria	....	3,297
Belgium	200	1,097
France	550	12,548
Germany	190	14,721
Holland	40	22,027
Italy	60	1,622
United Kingdom	400	9,827
Other countries	....	3,590
Total copper	1,440	68,729
Matte	....	286
Imports—		
Copper	10	15,882
Matte	....	984
Ore	....	20,840

France took the bulk of the exports.

Imports of copper into the United States, in all forms, with re-exports of foreign copper, are reported by the Bureau of Statistics of the Treasury Department as below, for the five months ending June 30; the figures being in long tons, of 2,240 lbs.:

Fine Copper—	1902.	1903.	Changes.
Imports	14,630	28,818	I. 14,188
Re-exports	3,120	934	D. 2,186
Net imports	11,510	27,884	I. 16,374
Ores and Matte—			
Imports	31,091	122,647	I. 91,556
Re-exports	8,623	3,610	D. 5,013
Net imports	22,468	119,037	I. 96,569

As ores and matte are not reported separately, it is not possible to give the fine copper contents closely. Estimating as closely as possible, however, we find that the total net imports of copper in all forms, this year, were equal, approximately, to 33,301 long tons of fine copper.

Of the fine copper imported this year 16,737 tons came from Mexico, and 4,197 tons from Great Britain. Of the imports of ores and matte, 101,456 tons came from Canada. A large part of this was British Columbia ore, shipped to the Northport and other smelters.

Exports of domestic copper, in all forms, from the United States are reported by the Bureau of Statistics as below, for the six months, the figures being in long tons:

	1902.	1903.	Changes.
Fine copper	90,016	64,354	D. 25,662
Ores and matte	11,152	5,985	D. 5,167

Again estimating the ores and matte, we find that the exports in all forms were approximately equal to 66,292 long tons of fine copper this year, against 94,629 tons in the first half of 1902; a decrease of 28,337 tons, or 29.9 per cent, this year.

Tin.—The scarcity of spot metal continues, but otherwise the market is without any special feature, the business transacted not being out of the ordinary. At the close we quote spot at 28½@28¾c.; August, 28@28¼c.; September, 27½@27¾c.

The foreign market, which closed weak at £127 10s., opened on Tuesday at £127 5s., and the closing quotations on Wednesday are cabled as £127@£127 2s. 6d. for spot, £123@123 2s. 6d. for three months.

Statistics for the month of July show an increase in the visible supplies of 2,000 tons.

It is reported that the production in the Straits for this year is not likely to show much, if any, increase over last year. It is also officially announced that the Banka sales during the year 1904 will be 55,000 slabs each, being equal to a total of 11,500 tons, which is a reduction from the current year of about 3,500 tons.

Imports of tin into the United States for the six months ending June 30 are reported as below, in long tons, of 2,240 lbs.:

	1902.	1903.	Changes.
Straits	11,792	12,985	I. 1,193
Australia	145	132	D. 13
London	7,364	7,456	I. 92
Holland	664	585	D. 79
Other countries	177	315	I. 138
Totals	20,142	21,473	I. 1,331

The tin received from Great Britain is chiefly Straits tin; that from Holland is Banka and Billiton tin. The increase this year was in Straits tin, chiefly in that received directly.

Visible stocks of tin on August 1 are reported as follows, in long tons, of 2,240 lb.:

	Store.	Afloat.	Totals.
U. S., except Pacific ports	919	2,115	3,034
Great Britain	4,314	5,299	9,613
Holland	3,422	438	3,860
Totals	8,655	7,852	16,507

The total compares with 16,809 tons reported on August 1, 1902; showing a decrease of 302 tons.

Lead is quiet but steady, without any special feature. The ruling quotations are 4@4.02½c. St. Louis, 4.05@4.10c. New York.

The foreign market is again lower, Spanish lead being quoted at £10 18s. 9d.@£11; English lead, £11 1s. 3d.@£11 2s. 6d.

Imports of lead in all forms into the United States, with re-exports of foreign lead, are reported by the Bureau of Statistics of the Treasury Department as below, in short tons, of 2,000 lbs.

	1902.	1903.	Changes.
Lead, metallic	2,143	191	D. 1,952
Lead, in ores and base bullion	51,564	52,154	I. 590
Total imports	53,707	52,345	D. 1,362
Re-exports	39,674	38,638	D. 1,036
Balance	14,033	13,707	D. 326

Of the imports this year 46,797 tons, or 89.5 per cent of the total, came from Mexico and 3,475 tons, or 6.6 per cent, from Canada. The balance over re-exports, shown above, is not consumed here, as a rule; most of it is retained in bond for future export. In addition to the re-exports given, there were 44 tons of domestic lead exported this year, against 2,734 tons last year.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of July 18, that the price of silver has been 13.25 reales per oz.; exchange stands at 34.45 pesetas to £1. Local quotation for pig lead on wharf has been 62 reales per quintal, which on current exchange is equal to £10 1s. 6d. per ton of 2,240 lb., f. o. b. Cartagena. Shipments for the week were 10,076 kgs. pig lead, 93,000 kgs. soft lead, and 890 kgs. silver bars, all to Marseilles.

Spelter remains very firm indeed, with a good demand on the part of consumers. The closing quotations are 5.47½@5.52½c. St. Louis, 5.65@5.70c. New York.

The foreign market is easy, good ordinaries being quoted at £20, specials £20 5s.

Exports of spelter from the United States for the six months ending June 30 were 1,113 short tons, against 2,593 tons in the first half of 1902; a decrease of 1,480 tons. Exports of zinc ore for the six months were 20,819 tons, against 21,850 tons last year, showing a decrease of 1,031 tons.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of July 18, that very little business has been done, owing to the continued difference of opinion between miners and buyers. The miners continue to hold out for higher prices, expecting spelter to improve. No shipments are reported for the week.

Antimony is quiet but steady. We quote Cookson's at 7¼@7½c.; Gallett's, 6⅞@6½c.; Hungarian, French, Japanese, United States and Italian at 6¼@6⅜c.

Imports of antimony into the United States for the six months ending June 30 are reported as follows, in pounds:

	1902.	1903.	Changes.
Metal and regulus	2,828,073	3,236,828	I. 408,755
Antimony ore	248,817	1,766,532	I. 1,517,715

This shows very large increases this year, both in metal and ore.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Prices of nickel anodes are as follows: 80 to 82 per cent nickel, 45@50c. per lb.; 82 to 84 per cent, 52@57c.; 95 to 97 per cent nickel, 54@59c. The lowest price, in each case, is for lots of 500 lbs. or over; the highest for lots of 100 lbs. or less.

Exports of nickel, nickel oxide and nickel matte from the United States for the six months ending June 30 were 1,188,793 lbs., against 1,420,007 lbs. in 1902, a decrease of 231,214 lbs. this year.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Imports of platinum into the United States for the six months ending June 30 were 4,391 lb., against 3,886 lb. in 1902; an increase of 505 lb. this year.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for smaller orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Exports of quicksilver from the United States for the six months ending June 30 were 728,010 lb., against 325,984 lb. in 1902; showing an increase of 402,026 lb. this year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.		Per lb.
No. 1 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2 90% ingots	31@34c.	Magnesium, pure (N.Y.)	60c.
Rolled Sheets	4c. up	Magnesium	$2.75
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop (30% Mn)	38c.
Bismuth	$2.10	Molybdenum (Best)	$1.82
Chromium, pure (N.Y.)	80c.	Phosphorus, foreign	45c.
Copper, red oxide	50c.	Phosphorus, American	70c.
Ferro-Molybdu'm (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20@25% N. Y.)	55c.		

Variation in prices depends on size of orders, deliveries, etc.

MISSOURI ZINC ORE MARKET. Aug. 1.

(From Our Special Correspondent.)

A local contest for lead ores seems on in earnest, as the price, now $54 per ton, is $2 higher than the old 70 per cent basis of figuring the value of this mineral. It is thought to be inaugurated by the American Smelting & Refining Company to displace several local smelters that are encroaching on their exclusiveness in this field. An advance was made the past week, the third during July, giving a total advance for the month of $2.50 per ton. On present prices for this mineral there would be an allowance of only $3 per ton for smelting charges, against the old established rule of $7. This would indicate that there was a pretty contest for the lead concentrates or that too high a price has been deducted heretofore for a smelting charge. The former is more reasonable, as the lead output of the district this year has been 1,215 tons less than the corresponding period of last year, and the product is being divided among more smelters.

Again this week one lot of zinc sold at $41 per ton. It was from the H. P. & P. Mine, on the land of the Continental Zinc Company, and assayed 65.75 per cent zinc. Prices generally are the same, the assay basis remaining from $35 to $37 per ton for 60 per cent zinc. The zinc market is featureless, further than every indication points to a maintenance of the present splendid price of this ore. Reports from all over the field in prospecting and developing convey the news of great activity and new mines are being brought in each month, yet the output is growing very slowly. Just at present a scarcity of powder is proving a small hindrance in some quarters, and at Aurora an inability to obtain cars has caused to be piled up the largest reserve stock of any camp in the district, amounting to about 700 tons. The total reserve stock is now less than 4,000 tons, smaller than at any time for a year.

Following are the shipments of zinc and lead and the combined value for each of the camps of the Joplin district for the week ending August 1:

	Zinc, Lbs.	Lead, Lbs.	Total Value.
Joplin	2,716,970	335,530	$59,325
Webb City-Carterville	2,045,540	461,730	48,145
Galena-Empire	1,006,130	75,860	19,655
Duenweg	622,510	241,590	17,915
Oronogo	394,430	4,590	7,185
Alba-Neck	344,470	.....	6,545
Carthage	339,569	.....	6,450
Granby	379,000	30,000	5,385
Aurora	221,240	20,570	4,460
Zincite	237,850	.....	4,400
Central City	209,370	1,800	3,495
Spurgeon-Spring City	141,420	40,340	3,330
Cave Springs	146,140	16,660	3,115
Badger	131,450	12,200	2,770
Fortuna	57,140	60,150	2,765
Prosperity	80,120	24,820	2,110
Carl Junction	60,260	.....	1,015
Ash Grove	.....	31,200	840
Peoria	.....	18,360	465
Total sales	9,133,500	1,375,400	$199,370
Thirty-one weeks	292,742,280	34,910,140	$5,952,505

Zinc value: Week, $162,580; 31 weeks, $5,010,285.

Lead value: Week, $36,790; 31 weeks, $942,220.

Zinc shipments were 103 tons lighter than the previous week and 736 tons less than a year ago. The lead shipment was 20 tons larger. The total zinc shipments for the year to date are 18,991 tons less than for the same period of last year.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.861c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London. Standard. 1903.	Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	13.094	11.771	13.341	11.923	56.64	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.08
December	.....	11.430	.....	11.590	....	50.95
Year	.....	11.626	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London, Pence.	1903. N. Y. Cents.	1902. London, Pence.	1902. N. Y. Cents.	1901. London, Pence.	1901. N. Y. Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Andes	Nev.	..	Aug. 11	Sept. 13	.10
Belle Josephine	Cal.	..	Aug. 20	.....	.60
Century	Cal.	..	Aug. 17	.....	.39
Columbus Con.	Cal.	..	Aug. 10	.....	.01
Exchequer	Nev.	42	Aug. 15	Sept. 3	.03
Galena	Utah	8	Aug. 12	Aug. 29	0.05
Highland	Utah	9	Aug. 10	Sept. 1	0.01
Manhattan	Utah	6	Aug. 20	Sept. 10	.00¼
Maple	Utah	9	Aug. 3	Aug. 21	.00⅜
Mayday	Utah	..	Aug. 15	Sept. 3	.02
New State	Utah	5	July 20	Aug. 20	.02½
Overman	Nev.	..	Aug. 19	.....	.10
Savage	Nev.	..	Aug. 25	.....	0.10
Seg. Belcher & Midas	Nev.	32	July 29	Aug. 18	.05
Shenandoah	Cal.	..	Aug. 10	.....	.02
Sierra Nevada	Nev.	..	Aug. 14	.....	.10
Skylark Copper	Utah	..	July 24	Aug. 10	.00½
Sonora Quartz	Mex.	..	Aug. 20	.....	0.01
South Swansea	Utah	2	Aug. 7	Aug. 25	0.02
Spider	Utah	..	Aug. 12	Sept. 1	.00¼
Tetro	Utah	26	July 25	Aug. 22	.02

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
Alaska-Mexican	Aug. 31	0.50	769,440	21,964,980
†Cambria Steel, Pa	Aug. 15	1.50	675,000	6,450,000
*San Joaquin Oil, Cal	Aug. 1	.05	5,000	185,000
Pittsburg Oil, Cal	Aug. 1	.02½	6,000	30,000
Stratton's Independence	.....	.25	265,002	3,930,273
†Last Dollar, Colo	Aug. 15	.02	30,000	240,000
*Bunker Hill & Sull	Aug. 4	.03	9,000	1,514,000
*Central Lead, Mo	Aug. 15	.50	5,000	365,000
*Daly West, Utah	Aug. 10	.60	108,000	3,023,000
*Empire State, Idaho	Aug. 15	.05	25,277	1,763,878
*Imperial Oil, Cal	Aug. 6	.20	20,000	420,000
*N. Y. & Hond., Rosario	Aug. 15	.10	15,000	1,970,000
†National Carbon pf	Aug. 15	1.75	78,750	1,506,250
Quincy	Aug. 15	3.00	300,000	14,120,000
†U. S. Steel, com	Sept. 9	1.00	5,083,025	50,809,577
U. S. Steel, pf	Aug. 15	1.75	8,929,919	89,262,829

*Monthly. †Quarterly.

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	July 29. H.	July 29. L.	July 30. H.	July 30. L.	July 31. H.	July 31. L.	Aug. 1 H.	Aug. 1 L.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Sales.
Alta, Nev.	1		.05								.05				1,000
Amalgamated c.,Mont	100	1,538,879	43¼	41¾	42¼	40	41⅝	40½	41⅝	41	41⅛	40⅝	40½	38¼	80,975
Anaconda c., Mont.	15	1,200,000	74	72½			72¾						70¼	69⅝	1,400
Anaconda Gold, Colo.	5	1,000,000			.12										500
Best & Belcher, Nev.	3	100,000							1.85						100
Breece, Colo.	25				.20										100
Caledonia, Nev.	2½				1.40										150
Chollar, Nev.	100	112,000			.20										200
C. K. & N., Colo.	1	1,431,800	.22												1,000
Con.Cal.&Va.,g.s.,Nev	2½	216,000	1.40		1.40		1.40		1.45		1.45		1.50		1,750
Cons. Imperial, Colo.	1	500,000							.05						1,000
Cripple Creek, c., Colo	1	2,000,000									.03				1,000
Elkton, g., Colo.	1	1,250,000	.45		.45						.45				600
Eureka, Nev.	20	50,000	.24		.25										200
Gold Dollar, Colo.	1						.04½				.04				1,500
Golden Fleece, Colo.	1	600,000			.12	.10									1,000
Greene Con., c., Mex.	10	720,000	18⅞	18⅜	18¾	18⅛	19⅜	18⅜	19¼	19¼			19	17	8,790
Gould & Curry, Nev.	1		.40												500
Hale & Norcross, Nev.	3				51		53				50		.50		900
Horn Silver, Utah	25	400,009					1.15		0						200
Iron Silver, Colo.	20										1.85				50
Isabella, g., Colo.	1	2,500,000	10½	20									.10		2,000
King & Pembroke,Ont	10				.04			0							3,000
Leadville, Colo.	10				.03										1,000
Little Chief, Colo.	1										.07				300
Mexican, Nev.	3	100,800									1.10	1.05			200
Occidental, Nev.	3	1,000,000			30								33	33	600
Ophir, Nev.	1	100,800	1.50				1.55								400
Overman, Nev.	1	115,200							30						200
Pharmacist, Colo.	1	1,500,000					.02½				.03				1,500
Portland, Colo.	10	3,000,000							1.10		1.12	1.10			500
Potosi, Nev.	3	112,000	.22		.21										700
Savage, Nev.	2½	112,000			.15										500
Sierra Nevada, Nev.	3	100,000					.55								200
Silver Hill, Nev.	1	180,000	.72										.74		265
Small Hopes, Colo	20	250,000					30								100
Standard, Cal.	10														
Syndicate, Cal.	1	100,000									.05				500
Tenn., c., Tenn.	25	175,000	20¾	20			20¾				27	25			900
Union Con., Nev.	2½	100,000					77	75					78		450
Union Con., N. C.	10	300,000	1⅛		1⅛		1		1⅛		1⅛	1	⅞	¾	4,475
Uni'd Cop. com.,Mont	100	450,000	16½		10¾	16¼	16⅜		16⅜		16¾		16⅞		700
Utah, Nev.	1														
White Knob, g. s., Ind.	100	150,000	9½	9	9½		9½	9	9¼				8¾		1,710
Yellow Jacket, Nev.	3	120,000					.69								300

Total sales 122,415 shares. † Ex-Dividend

BOSTON, MASS.*

Name of Company.	Par val	Shares listed	July 29 H.	July 29 L.	July 30 H.	July 30 L.	July 31 H.	July 31 L.	Aug. 1 H.	Aug. 1 L.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Sales.
Adventure Con., c.	$25	100,000	5⅞	5¼	5⅝	5¼	6	5¼	5¾		5¾				838
Allouez.	25	99,511	6	5¼	5⅜	5⅛	5½	5					5¼	4⅜	1,035
Amalgamated, c.	100	1,538,879	43¼	41¾	‡2½	49⅛	40¾	40½	42	41	41½	40¾	40⅝	38⅜	18,213
Am. Gold Dredging.	5	90,000									.75	370			210
Am. Z. L. & Sm.	25	60,000					a						9		150
Anaconda	25	1,200,000	18⅜				17½	b	18⅞						240
Arcadian, c.	25	150,000	2		2		2		2¼	2	2		2		770
Arnold	25	60,000							.50		.50				305
Atlantic, c.	25	100,000	10				9		9		9				130
Bingham Con., g. s.	50	150,000	23		23	22½	23¼				23		23		585
Bonanza.	10	300,000													
British Columbia.	5	256,500													
Cal. & Helca, c.	25	100,000	425	415	425		425		430				430		81
Centennial, c.	25	90,000	16¼	15⅛	15¾	15	15½	14⅞	15⅜		15⅜	15	15¼	14½	3,366
Central Oil.	25	60,000					6								
Con. Mercur, g.	5	1,000,000	1½		1½		1⅝	1½			1⅝		1⅛		344
Copper Range Con.	100	285,000	43¼	41⅝	42¾	41½	43	42½	42¾	42½	33	42½	42½	40½	8,740
†Daly-West.	20	180,000	39½	39	39¼	39	39		38½		39		39½	38½	505
Dominion Coal.	100	150,000	95	94	93½	90¾	90½	90	95½	00½	06	87	89	87	4,120
Dominion Coal, pf.	100	30,000													
Dominion I. & S.	100	100,000			13¼	12¾	13		11¼		12	11¾	11¾	10	1,485
Elm River.	12	100,000	3½	2¾	3		3				3				1,290
Franklin, c.	25	100,000	8½	8	9		8¼	8			8¼		8¼	8	393
Granby Con.	10	1,336,303	3⅜		3¾										300
Guanajuato Con.	5	385,000											1½	1⅛	55
Isle Royal Con., c.	25	385,000	7	6½	7	6½	6½				7	6	6¾		1,465
Mass Con., C.	25	100,000	5		5⅜	5			5½		5½				300
Mayflower, c.	25	100,000													
†Michigan, c.	25	100,000			7						7				40
Mohawk, c.	25	100,000	36¾	36	38	36	37	36¼	37	36½	37	36¼	36½	39½	3,266
Mont. Coal & Coke.	25	200,000							5						20
Mont'l & Boston, c.	5	570,000													
New Idria.	5	100,000	8½	8											100
Nova Scotia St. & C.	100	37,623													
Nova Scotia St.&C., pf.	100	16,300													
Old Colony, c.	25	100,000	1¼	1⅝							1⅜	1¼	1	0	1,035
Old Dominion, c.	25	150,000	11¼	10½	11¾	10½	11½	11	12	11⅜	13½	12½	12⅛	11¼	3,792
Osceola, c.	25	96,150	53	52	52	51	51				51	50½	51¼	50⅝	407
Parrott, s. c.	10	229,850	19¼	18¼	18⅜	18	19⅛	18					20	18	1,477
Phœnix Con, c.	25	100,000			4										150
Quincy, c.	25	100,000	89				85		87	86	90		90½	90	165
Rhode Island, c.	25	100,000					1¼								100
Santa Fe, g. c.	10	250,000					1				1				250
Shannon, c.	10	188,153	10¼	.0	10	9½					10⅛	9¾			490
Tamarack, c.	25	60,000	90	85	85	80							80		99
Tecumseh.	25	80,000													
Tennessee.	25	100,000													
Trimountain.	100	450,000							81½						5
Trinity, c.	25	419,000	5¼	5¼	5½	5¼	5½	5⅜	5⅜		5⅜	5	5¼	4	2,840
United c.	25	240,000											14		25
United States, g.	10	300,000	18⅛	17¾	18⅛	17⅜	17⅞	17⅜	18	17½	17¾		17¼	16¾	5,203
U. S. Coal & Oil.	25	100,000	11	10¾	10½	10⅜	11	10¼	11	4	10½	10	10		1,150
Utah Con., g.	25	100,000	25¼	24⅝	25	24½	25	24⅝			25		25	24	2,445
†Victoria	25	60,000	4¼	5	4¼		4¼						4		215
Winona, c.	25	100,000	8	7¼	7¾	7¼			7¾		7½		7		1,140
Wolverine, c.	25	60,000			63	62¾	63	62½	63		63		93	92½	311
Wyandot.	25	100,000	1⅝				1¼						1¼		610

*Boston Stock Exchange. †Ex Dividend. ‡Assessment Paid. §Holiday. Total sales, 70,235 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	July 24. H.	July 24. L.	July 25. H.	July 25. L.	July 27. H.	July 27. L.	July 28. H.	July 28. L.	July 29. H.	July 29. L.	July 30. H.	July 30. L.	Sales
Central Eureka.	Cal.	$400,000					.90		.88	.87	85				940
Colehan.	Nev.	1,000,000			.16		.16		116						1,050
Esperanza.	Nev.	1,000,000	.06	.05	.05		.06	.05	.06		.05		.05		18,750
Gipsy Queen.	Nev.	750,000					.27		.27		.27				900
Gold Min. Con.	Nev.	750,000													
Lucky Tom.	Nev.	1,000,000													
MacNamara.	Nev.	500,000	.21	.20	.22		.23		.23				.23		2,700
Mont-Tonopah.	Nev.	1,000,000	.99	.96	.97		.95	.95	1.00	.95	1.00	.95	1.02½	1.00	3,900
New York Tonopah.	Nev.	1,000,000					.10						.07		200
Paymaster	Nev.	750,000							.15						100
Rescue.	Nev.	500,000	.15	.14	.14		.13		.14				.15	.14	8,600
Tonopah-Belmont.	Nev.	2,000,000			1.95		2.00								150
Tonopah & Cal.	Nev.	2,000,000					.37	.35	.36	.34	.37	.85	.38	.37	2,900
Tonopah Fraction.	Nev.	750,000													
Tonopah Midway.	Nev.	1,000,000													
Tonopah Mg. Co.	Nev.														
Tonopah North Star.	Nev.	750,000	.51	.50					.55	.51	.53	.52	.51	.48	5,500
Tonopah & Salt Lake.											.46	.45			200
Tonopah Union.	Nev.	750,000													
United Tonopah.	Nev.	1,000,000							.16						1,000

*San Francisco & Tonopah Mining Exchange. Total sales 46,890 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val.	Shares Issued.	July 29. H.	July 29. L.	July 30. H.	July 30. L.	July 31. H.	July 31. L.	Aug. 1 H.	Aug. 1 L.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Sales
Allis-Chalmers, U. S.	$100														
Allis-Cham's, pf, U. S.	100	200,000													
Am. Agr. Chem., U. S.	100														
Am.Agr.Chem.pf,U.S.	100	181,350													
Am. Sm. & Ref., U. S.	100	500,000	44	42½	42⅝	42¼	42¾		43½	43	42¾		42¾	41	12,400
Am.Sm. & Ref.,pf,U.S.	100	500,000	90⅜	90	90	89½	90⅝	90⅜	94⅛		90⅞		90	89½	2,602
Am. Steel & Fdy.,U.S.	100												11		500
Am. S. & Fdy., U. S.	100	155,000													1,000
Col. Fuel & I., Colo.	100	239,320	50	46	46	41	49½	44	45				45	44	1,990
Col. & H. C. & I., Colo.	100	89,244	14¾	13¾	14½	14	14½		15	14¾			14		2,470
†Crucible Steel, U. S.	100	250,000	12⅛	12	12⅛	11½	11⅝						11⅝	11¼	1,677
†CrucibleSteel,pf,U.S.	100	250,000	75¼	75	75¼		74¾	74	74½	74	74	73½	74	72½	1,106
†Mong. R. Coal, Pa.	50	200,000	10¼		10¼		10¼		10¼		38¼	31¼	10¼		3,520
†Mong. R. Coal, pf, Pa.	50	98,300	38½		38½		38¼						38⅜	38	445
National Lead, U. S.	100	149,054	14	3½									15½	14	1,627
National Lead, pf,U.S.	100	149,040	83½	83									85	81	322
†Phila. Nat. Gas.	100	308,542											40		10
†Phila. Nat. Gas, pf.	100	212,873													
†Pittsburg Coal, Pa.	100	300,307	28¾	26⅜	27	26¾	27		28	27¾	28¼	28	28	27	5,310
†Pittsburg Coal,pf,Pa.	100	297,012	84½	83½	84½	84½	84⅜	84	84¼	84	85	84¼	84¾	84	2,353
Republic I. & S., U. S.	100	273,520	13⅞	10⅝	12⅜	12	12	11¾	11¾				11¾	11¾	4,800
Republic I.&S.,pf,U.S.	100	203,569	68½	65½	66	65½	66	64½					64	63	4,600
Sloss-Shef S. & I., Ala.	100	75,000	32	31	32¼	31	33½	33	33	32½	33		32½	31½	1,820
Sloss-ShefS.&I.pf,Ala.	100	65,085													300
Standard Oil, U. S.	100	970,000	930	625	625								625	918	620	600	169
Tenn. C.I. & R.R.	100	225,000	41⅝	40½	40⅝	38¾	39½	38¾	39		40	38¾	39	37	10.270
U.S. Red. & Ref., U. S.	100	59,188													400
U.S.Red&Ref.,pf, U.S.	100	39,485													200
U.S. Steel Corp., U. S.	100	5,084,952	24⅞	24⅛	24⅛	23½	24	23½	24	23¾	23⅞	29¾	23¾	23	171,590
U.S. SteelCrop.pf, U.S.	100	5,103,141	73¼	72½	73	71⅝	72⅛	71¼	72½	71½	71¾	71	70⅝	69	74.778
Va.-Car Chem., U. S.	100	279,844	39¾	36⅞	36⅛	32	34	32	34⅜	33	34	32	32	25	28.169
Va.-Car Chem.,pf,U.S.	100	120,000	103	100	100½	79	100½	99			103¼	97	83	80	3,615
Va. I. C. & Coke, U. S.	100	86,416	24½	22			22¾								350

*New York Stock Exchange. †Pittsburg Stock Exchange. ‡Ex-dividend. Total sales 336,491

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	July 25 H.	July 25 L.	July 27 H.	July 27 L.	July 28 H.	July 28 L.	July 29 H.	July 29 L.	July 30 H.	July 30 L.	July 31. H.	July 31. L.	Sales
Acacia.	$1	1,500,000	.07½	.06½	.07½	.97	.07⅜	.06⅞	.07½	.07	.07½	.06¾	.07½	.06½	1,000
Am. Con.	1	2,000,000	.02		.02		.02		.02	.91½	.02	.01	.02	.01	1,000
Anaconda	5	1,000,000	.11	..0	.1[illegible]	.10½	.11	.10½	.11	.10¼	.10½		.12	.07	
Ben Hur.	1	900,000													
Blue Bell.	1	1,000,000	.05¾	.95	.96	.95	.06	.95	.05		.06	.05	.06	.05	
C. C. & M.	1	1,000,000	.02¼	.02½	.92½	.02½	.03½	.02¼	.02¼		.02½	.02¼	.02½	.02¼	2.000
C. K. & N.	1	1,250,000	.21½	.20⅞	.21⅛	.20¼	.20⅜	.20½	.20½	.20	.20⅝	.20	.20½	.19¾	11,500
C. C. Con.	1	2,000,000	.05	.04	.05	.94	.04½	.04	.05	.04	.04½	.04	.04½	.94	1,000
Coriolanus.	1	1,500,000	.02½		.02		.02½		.02¼		.02½		.02		
Des Moines.	1	750,000	.02½		.93⅝	.02½	.02½	.02¼	.92½		.03½	.02½	.02½	r.	
Dr. Jack Pot.	1		.09	.08¾	.09½	.08¾	.09	.08¾	.09	.08½	.09	.03½	.09	.08½	
Elkton Con.	1	1,250,000			.42	.49½	.41	.49	.42	.40	.42	.40	.42	.40	3,300
El Paso.	1	900,000	.60	.56¾	.58	.57½	.58	.57½	.58½	.57⅝	.59	.58	.59	.58	4,000
Fannie Rawlings.	1	1,000,000	.03¾		.03¼		.03	.02	.04¼	.03½	.02		.03	.02	
Findley.	1	1,250,000	.14¼	.13½	.14¼		.14½				.14¼	.13½	.14¼	.13¾	
Gold Bond.	1	1,000,000	.02⅜		.02⅜		.02		.92		.02		.02		2.500
Gold Dollar Con.	1		.04⅝	.04½	.04½	.04⅜	.04½	.04⅜	.04⅜	.04⅜	.04¼	.04⅛	.04⅛	.03⅝	13,500
Golden Cycle.	1	2,000,000							.79	.64	.96	.93½	.96	.64	2.000
Golden Fleece.	1	600,000	.20		.20	.05	.20		.20	.96	.25		.20		
Gould	1	1,250,000	.02⅞	.02⅝	.03		.03	.02½	.03	.02½	.03	.02½	.02¼	.02	5,000
Hart.	1	1,000,000	.02		.05	.62	.05	.02					5.		
Isabella	1	2,500,000	.11½	.11	.11		.11¼	.11	.11¼	.11	.11¾	.11	.11	.10	10.000
Jack Pot.	1	1,250,000													
Last Dollar.	1	1,500,000	.75	.32	.75		.50		.50		.50		.50		
Lexington.	1	1,500,000	.03⅝	.03½	.04	.03½	.03⅜	.03⅜	.03⅝	.03½	.03⅝	.03½	.03⅝	.03½	3,000
Little Puck.	1	2,000,000	.02		.92		.02		.92		.02		.02		
Mollie Gibson	5	1,000,000	.06		.06		.96				.06		.05½		
Moon-Anchor.	1	600,000	.09	.08½	.09	.08		.09			.08⅝	.08	.08½	r08	1.000
New Haven.	1	1,500,000	.03	.02½	.03	.02½	.02⅞	.02½			.02⅞	.02½	.02¾	.02½	5.000
Pharmacist, Con.	1	1,500,000	.03½	.03	.03⅝	.03	.03⅜	.03			.03½	.03⅜	.03½	.03	1,000
Pinnacle	1	2,000,000	.03⅞		.03⅝	.03	.03½				.03½		.03½		1,000
Pointer.	1	1,250,000	.08		.08		.01½	.009			.01¼	.009	.01½	.009	1.000
Portland	1	3,000,000	1.30	1.21	1.30	1.11	1.25	1.15			1.25	1.15	1.25	1.19¾	900
Prince Albert.	1	3,000,000	.02½	.02	.02½		.02½	.02			.02		.92		2,000
Vindicator	1	1,500,000	.85	.50	.90		.85	.56			.90		.90		100
Work	1	1,500,000	.05¼	.05	.05¼	905	.05½	.05			.05½	.05	.05	.03⅜	5.500

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 77,300 shares.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Aug. 3. H.	Aug. 3. L.	Aug. 4. H.	Aug. 4. L.
Acacia.	.07¼	.06⅜	.07	.06¾
Am. Con.	.02⅛	.01⅝	.02½	.01½
Anaconda	.11	.10	.10⅝	.10⅛
Blue Bell.	.05¾	.05	.05½	.05
Cripple Creek Con.	.05	.04		
C. K. & N.	.19⅝	.19	.19⅝	.19
Doctor Jack Pot.	.09	.08½	.09	.08¾
Elkton, Con.	.42	.40	.42	.40½
El Paso.	.58¾	.57¾	.59¼	.59
Findley	.13⅜	.13	.14	.12½
Gold Dollar Con.	.04⅛	.04	.04¼	.04⅛
Golden Cycle.	.68	.63¾	.66	.64
Golden Fleece.	.20	.06	.29	.06
Gould	.02½	.02	.02½	.02

Name of Company.	Aug. 3. H.	Aug. 3. L.	Aug. 4. H.	Aug. 4. L.
Isabella.	.10⅝	.10½	.11	.10⅝
Jack Pot.	.10	.08	.10	.08
Keystone.	.04	.03½	.04	.03⅝
Last Dollar.	.50	.35	.50	.35
Lexington.	.03⅝	.03⅜	.03⅝	.03¼
Little Puck.	.03	.02	.03	.02
Mollie Gibson.	.06	.05	.06	.05
Moon Anchor.	.10	.08	.09	.08¼
Old Gold.	.07	.06¾	.07½	.06¾
Pharmacist	.03½	.03⅛	.03½	.03⅛
Pinnacle.	.03⅝	.03	.03⅝	.03
Portland.	1.23	1.20	1.25	1.20
Vindicator.	.85	.70	.85	.70
Work.	.05½	.05	.05½	.05

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	August. 3.	August. 4.
Belcher	104,000	.41	.43
Best & Belcher.	100,800	1.75	1.85
Caledonia.	100,000	1.35	1.30
Challenge Con.	50,000	.42	.43
Chollar.	112,000	.19	.20
Confidence.	24,960	1.10	1.10
Con. Cal. & Va.	216,000	1.50	1.60
Con. Imperial.	500,000	.03	.04
Crown Point.	100,000	.23	.24
Gould & Curry.	108,000	.41	.43
Hale & Norcross.	112,000	.48	.48

Name of Company.	Shares Issued.	August. 3.	August. 4.
Justice.	105,000	.13	.15
Mexican.	100,800	1.10	1.25
Occidental Con.	100,000	.36	.35
Ophir.	100,800	1.60	1.65
Overman.	115,200	.27	.27
Potosi.	112,000	.21	.21
Savage.	112,000	.17	.18
Sierra Nevada.	100,000	.56	.58
Union Con.	100,000	.82	.86
Utah Con.	100,000	.34	.35
Yellow Jacket.	120,000	.69	.71

STOCK QUOTATIONS

MEXICO*. July 24.

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos	2,400	5.00	90	95
Cinco Senores y An., aviadoras	2,000	15.00	190	195
Cinco Senores y An., aviada	400	10.00	175	185
Providencia, Sanduan de la Luz	6,000	2.00	155	165
Queensland y Australia	300	.....	95	105
Guerrero:				
Delfina, 1st serie	2,500	.....	40	45
Delfina, 2nd serie	2,500	.....	30	35
Garduno y Anexas	7,200	.....	45	60
Hidalgo:				
Amistad y Condordia	9,600	6.90	89½	90
Carmen, aviada	1,100	.....	140	150
Guadalupe Fresnillo Mill	1,000	.....	200	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,536	.....	.....	.....
La Blanca, aviada	768	.....	.....	.....
La Reina y An., aviadora	5,000	.....	25	26
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	120	180
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada	12,800	.....	6	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	10	12
Sta. Gertrudis y An., aviadora	28,800	1.00	91	92
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	18	20
San Felipe de Jesus, aviada	1,200	.....	.....	10
San Rafael y An., Trompillo	1,200	12.00	1,440	1,460
San Rafael y An., aviada	1,200	4.00	540	560
Soledad, aviada	960	.....	450	470
Sorpresa, aviada	960	5.00	325	330
.....	.....	.....	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran	2,400	.....	60	70
Aldebarren	.....	.....	195	200
Buen Despacho	2,000	.....	92	100
Dos Estrellas	3,000	30.00	.....	3,400
La Esperanza (El Oro.)	3,000	10.00	1,505	1,515
La Reformia, aviadores	2,000	.....	85	90
Providencia, pagadoras	1,000	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan:				
Luz de Borda, aviadora	3,000	.....	100	110
Luz de Borda, aviado	1,000	.....	.....	10
Nuevo Leon:				
La Fraternal	1,000	.....	550	600
Norias de Bajan	1,000	.....	700	800
Santiago y An., Tlal.	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An	3,000	.....	85	95
El Barreno, aviadora	2,000	2.00	30	33
Sta. Maria de la Paz	2,400	20.00	700	715
San Diegoy Annexas	2,400	4.00	22	28
Zacatecas:				
Asturiana y An	2,500	.....	55	65
Candelaria y Pinos	2,500	10.00	250	260
Cubiertas	2,400	.....	.....	.....
Esperanza y An	2,400	.....	30	50
Lourdes	2,500	.....	35	45
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	100	110
Nueva Quebradilla, aviadas	600	.....	60	80
San Carlos y Annexas	2,500	20.00	130	150
Sta. Maria de Gaud	2,500	10.00	75	85
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.)	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,100
Natividad (Oaxaca) aviadas	600	4.00	1,000	1,100
San Francisco Hac	6,000	1.00	.....	.....
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* Aug. 1.

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	$10	300,000	.23	.22	800
Ben Butler	1	500,000	.12	.12	58
California	1	300,000	.11	.09½	3,400
Carisa	1	500,000	.09¼	.09	2,900
Century	.....	.....	.39½	.39	2,500
Con. Mercur	5	1,000,000	1.54	1.51½	1,400
Daly	20	150,000	.....	.....	.....
Daly-Judge	1	300,000	9.85	9.20	1,560
Daly-West	20	300,000	39.50	38.25	883
Grand Central	1	250,000	4.40	4.30	365
L. Mammoth	1	150,000	.88	.76	11,500
L. Washington	½	300,000	.01	.00⅞	6,000
Mammoth	25	400,000	1.25	.99¾	1,500

Name of Company	Par Val	Shares	High	Low	Sales.
Majestic Cop	.....	.....	.....	.....	.....
May Day	¼	400,000	.13⅝	.13	4,000
N. Y. Bonanza	.....	.....	.32	.30½	7,000
Petro	100	10,000	.....	.....	.....
Sacramento	5	1,000,000	.24½	.23½	18,000
Silver Shield	.....	.....	.18½	.09	15,000
South Swansea	1	300,000	.....	.....	.....
Star Con	1	500,000	.27⅝	.25½	11,050
Uncle Sam	1	500,000	.25	.23½	13,500
Utah	10	100,000	.....	.....	.....
Victor	1	500,000	.....	.....	.....
Wabash	.....	.....	.21½	.17	5,600
Yankee Con	1	500,000	.33½	.30	2,700

*By our Special Correspondent. All mines are in Utah. Total sales, 113,713 shares.

ST. LOUIS, MO.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$10	300,000	$0.50	$0.75
Catherine Lead, Mo.	10	50,000	1.25	2.25
Central Coal & C	100	51,250	60.75	63.00
Central C. & C., pf.	100	18,750	73.50	74.00
Central Lead, Mo	10	100,000	110.00	120.00

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$10	50,000	$9.00	11.00
Con. Coal, Ill	100	50,000	22.00	22.75
Doe Run Lead Co	100	15,000	112.00	120.00
Granite Bimet, Mt.	10	100,000	.25	.42
St. Joe Lead, Mo,	10	600,000	15.85	17.00

*By our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Co.	Par val.	July 27. H.	July 27. L.	July 30. H.	July 30. L.	July 31. H.	July 31. L.	Aug. 1. H.	Aug. 1. L.	Aug. 3. H.	Aug. 3. L.	Aug. 4. H.	Aug. 4. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	7	.....	7	.....	.....	.....	7	.....	.....	.....	.....	.....	200
Cambria Iron, Pa	50	46½	44¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	244
Cambria S., Pa.	50	23	22¾	23	22¾	23	22⅝	.....	.....	22	21⅞	22	21	2,164
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Susq. I & S., Pa	5	1⅛	1⅛	.....	.....	.....	.....	1⅛	.....	.....	.....	.....	.....	250
United Gas I. Pa	50	86	84¾	85½	85	85	84½	85	.....	84¾	84¼	84	83¾	2,134
Warwick I. & S.	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 5,030 shares.

LONDON. July 25.

Name and Country of Company.	Shares Issued.	Par value. £.	s.	d.	Latest dividend. Amt. s.	d.	Date.	Quotations. Buyers. £.	s.	d.	Sellers. £.	s.	d.
Alaska-Treadwell, g., Alaska	200,000	5	0	0	3	0	Apr., 1903	4	7	6	4	12	6
Anaconda, c. s., Montana	1,200,000	5	0	0	2	0	May, 1903	3	12	6	3	15	0
Arizona, c., Def., ord	63,444	1	0	0	5	6	Feb., 1903	7	5	0	7	15	0
Arizona, pref., ord	316,350	1	0	0	5	6	Feb., 1903	7	7	6	7	12	6
Camp Bird, g., Colorado	738,000	1	0	0	1	6	July 1903	1	6	3	1	8	9
Central Chile, C., Chile	276,248	1	0	0	..	6	Jan., 1902		3	0		4	0
Copiapo, c., Chile	112,500	2	0	0	6	10	May, 1903	1	5	0	1	10	0
De Lamar, g. s., Idaho	80,000	1	0	0	2	0	Nov., 1902		10	0		12	6
El Oro, g., Mexico	1,000,000	1	0	0	1	6	July. 1903	1	11	3	1	13	9
Frontino & Bolivia, g., Columbia	128,662	1	0	0	3	0	July, 1901		16	3		18	9
Le Roi, g., British Col	200,000	5	0	0	5	0	Nov., 1899		19	3		18	9
Le Roi No. 2, g., British Col	120,000	5	0	0	5	0	May, 1902	1	2	6	1	5	0
Mesquital, Mexico	250,000		2	0		3	Feb., 1903		2	6		3	6
Montana, g. s., Montana	657,128	1	0	0		6	April 1899		1	9		2	3
Mountain, c., Cal	250,000	5	0	0	2	4½	May. 1903	2	17	6	3	2	6
Stratton's Independence, Colorado	1,000,007	1	0	0		6	Jan., 1902		8	0		8	6
St. John del Rey., g., Brazil	546,265	1	0	0		8	June, 1903		16	0		17	0
Utah Con., g . c. (Highland Boy), Utah	300,000	1	0	0	6	3	July, 1903	5	10	0	6	0	0
Ymir, g., British Col	200,000	1	0	0	1	0	Mar., 1902		5	0		7	6
European :													
Linares, l., Spain	15,000	3	0	0	1	0	Mar., 1903	2	0	0	2	10	0
Mason & Barry, c., sul., Port'g'l	185,172	1	0	0	11	0	May, 1903	3	10	0	3	15	0
Rio Tinto, c., Spain	325,000	5	0	0	27	6	May, 1903	45	12	6	45	17	6
Rio Tinto, pref., Spain	325,000	5	0	0	2	6	May, 1903	6	0	0	6	5	0
Tharsis, c., Spain	625,000	2	0	0	6	0	May, 1903	3	17	6	4	2	6
Australia and New Zealand :													
Assoc. Gold Mines, W. Australia	495,388	1	0	0	2	0	July, 1903	1	13	9	1	16	3
Briseis, tin, Tasmania	600,000	1	0	0	.....		.....		5	9		6	3
Broken Hill Pr'p, s., N. S. Wales	960,000		8	0	1	0	Feb., 1903	1	8	6	1	9	9
Cosmopolitan Prop., W. Australia	385,000	1	0	0	1	0	May, 1903		13	6		14	9
Golden Horse Shoe, W. Australia	300,000	5	0	0	6	0	Apr., 1903	8	6	3	8	8	9
Great Fingall Con., W. Australia	250,000	1	0	0	5	0	Apr., 1903	7	15	0	7	17	6
Great Bo'd'r Pr'p, W. Australia	1,750,000		2	0		6	June, 1903	1	6	0	1	6	6
Ivanhoe Gold Corp., W. Australia	200,000	5	0	0	4	0	Apr., 1903	8	12	6	8	15	0
Kalgurli, g., W. Australia	120,000	1	0	0	2	6	July, 1903	4	5	0	4	7	9
Lake View Cons., g., W. Australia	250,000	1	0	0	rts.		Aug., 1902	2	7	6	2	10	0
Mt. Lyell M. & R. I., c., Tasmania	275,000	3	0	0	1	0	July, 1903	2	18	9	3	1	3
Mt. Morgan, g., Queensland	1,000,000	1	0	0	3		July, 1903	2	17	6	3	0	0
Waihi, g., New Zealand	497,412	1	0	0	2	6	June, 1903	5	3	9	5	6	3
Indian:													
Champion Reef, g., Colar Fields	473,000		10	0	rts.		May, 1903	7	11	3	7	13	9
Mysore Gold, Colar Fields	568,043		10	0	4	0	July, 1903	6	18	9	7	1	3
Nundydroog, g., Colar Fields	484,000		10	0	1	6	Mar., 1903	2	10	0	2	12	6
Ooregum, g., Colar Fields	343,000		10	0	1	6	Apr., 1903	1	12	6	1	15	0
Ooregum, g., pref., g., Colar Fields	240,000		10	0	1	6	Apr., 1903	2	1	3	2	3	9
African :													
Angelo, g., Transvaal	600,000	1	0	0	6	0	July, 1903	6	17	6	7	2	6
Bonanza, g., Transvaal	200,000	1	0	0	10	0	June, 1903	3	18	9	4	1	3
British South Africa	4,436,019	1	0	0	rts.		May, 1889	2	10	0	2	11	3
Cape Copper, S. Africa	300,000	2	0	0	1	0	July, 1903	2	10	0	2	12	6
Cape Copper, pref., S. Africa	75,000	2	0	0	1	0	July, 1903	2	7	6	2	10	0
City and Sub'n (New), g., Transvaal	340,000	4	0	0	4	0	Aug., 1903	6	10	0	6	15	0
Crown Reef, g., Transvaal	120,000	1	0	0	4	0	June, 1903	16	15	0	17	5	0
De Beers Con., d., pref., Cape Colony	800,000	2	10	0	10	0	July, 1903	19	5	0	19	7	6
De Beers Con., def	1,000,000	2	10	0	15	6	Mar., 1903	19	12	6	19	15	0
East Rand, Prop., Transvaal	970,000	1	0	0	5	0	June, 1903	7	0	0	7	2	6
Ferreira, g., Transvaal	90,000	1	0	0	15	0	June, 1903	20	15	0	21	5	0
Geldenhuis Est., g., Transvaal	200,000	1	0	0	6	0	June, 1903	6	2	6	6	7	6
Geduld, g., Transvaal	400,000	1	0	0	rts.		Mar., 1902	6	3	9	6	6	3
Henry Nourse, g., Transvaal	125,000	1	0	0	8	0	Feb., 1903	8	16	6	9	2	6
Jagersfontein, d., Orange, F. S	200,000	5	0	0	6	0	Nov., 1889	28	17	6	29	2	6
Jubilee, g., Transvaal	50,000	1	0	0	5	0	July, 1903	5	0	0	5	5	0
Jumpers, Transvaal	100,000	1	0	0	5	0	Aug., 1899	3	7	6	3	12	6
Langlaagte Est., g., Transvaal	470,000	1	0	0	3	0	Sept., 1903	3	17	6	4	0	0
May Con., g., Transvaal	288,750	1	0	0	3	0	July, 1903	4	2	6	4	5	0
Meyer & Charlton, g., Transvaal	100,000	1	0	0	3	0	Feb., 1903	5	5	0	5	10	0
Modderfontein, g., Transvaal	290,000	1	0	0	rts.		Apr., 1902	9	3	9	9	6	3
Namaqua, c., Cape Colony	94,331	2	0	0	2	0	June, 1903	2	17	6	3	0	0
Primrose (New), g., Transvaal	325,000	1	0	0	2	0	Mar., 1903	3	15	0	3	17	6
Rand Mines, g., S. Africa	1,795,956		5	0	4	0	Aug., 1902	9	16	3	9	18	9
Robinson, g., Transvaal	750,000	5	0	0	5	6	Aug., 1903	10	5	0	10	10	0
Robinson Deep, g., Transvaal	950,000	1	0	0	10	0	May, 1903	4	10	0	4	15	0
Rose Deep, Transvaal	425,000	1	0	0	2	0	Feb., 1903	8	10	0	8	15	0
Salisbury, g., Transvaal	100,000	1	0	0	2	0	Mar , 1899	2	7	6	2	12	6
Sheba, g., Transvaal	1,075,000	1	0	0		6	July, 1599		17	6		18	9
Village Main Reef, Transvaal	400,000	1	0	0	4	0	June, 1903	7	17	6	8	2	6
Wemmer, Transvaal	80,000	1	0	0	10	0	July, 1903	11	10	0	12	0	0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

LONDON (By Cable.)*

Name of Company.	July 28. £.	s.	d.	August 4. £.	s.	d.	Name of Company.	July 28. £.	s.	d.	August 4. £.	s.	d.
Anaconda	3	15	0	3	15	0	Jagersfontein	28	15	0	28	17	6
British South Africa	2	8	9	2	8	9	Johannesburg Invest	2	17	6	2	17	6
Camp Bird	1	6	10½	1	6	3	Modderfontein	9	2	6	9	17	6
Con. Gold Fields	6	6	3	6	3	9	Rand Mines	9	15	0	9	8	9
De Beers Con. def	19	16	3	19	15	0	Rio Tinto, com	46	5	0	46	12	6
East Rand	6	15	6	6	17	6	Simmer & Jack	1	6	9	1	5	6
El Oro, Mex	1	12	6	1	12	6	Tomboy	1	14	3	1	15	0

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. July 23.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Boleo	Lower Cal	Copper	.....	500	176.00	1,400.00	1,370.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.75	18.75
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	88.50	90.50
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	338.00	345.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	471.00	471.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	450.00	450.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	8.00	8.25
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	661.00	664.00

TORONTO, ONT.*

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.04	.02	2,000
Cariboo (Mc. K.)	1	.13	.....	.....
Cariboo (Hyd.)	1	.75	.....	.....
Center Star	1	.30	.25	.....
Crows Nest, C	100	3.50	2.75	.....
Dominion Coal, com	100	.96	.89	.....
Dominion S. & I	100	.13	.11	.....
Dominion S. & I., pref	100	.....	.....	.....
Fairview	1	.05½	.03½	.....
Giant	1	.04	.03	3,000

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter	$10	4.90	3.00	100
Mountain Lion	1	.28	.20	.....
North Star	1	.14	.11	.....
Nova Scotia Steel, com	100	.94	.92	.....
Payne	1	.22	.18	.....
Rambler Cariboo	1	.40	.....	.....
Republic	1	.04	.02	.....
St. Eugene	1	.48	.40	.....
Virtue	1	.07	.05	.....
War Eagle Con	1	.14	.11	.....

*Standard Stock and Mining Exchange. Total sales, 3,100 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09¼
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03¼
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04¼
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood, 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		1.00
Powdered	"		3.00
Chrome, com'l			2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.03½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (98%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¾
Oxide, com'l white, 95%	"		.03½
Com'l white, 99%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.02¾@.02⅞
Red	"		.03⅝@.06¼
ASPHALTUM—			
Ventura, Cal.	sh. ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05¼@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh. ton		25.00@27.00
92@98%	"		26.00@28.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05⅞

	Cust.	Meas.	Price.
BARIUM Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		18.00
BAUXITE—Ga. or Ala. Mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.08¼
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMIDE—Bulk	"		.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs.	"		.80
Slag cement,	"		1.50@1.60
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh. ton		3.25
Ppt. per quality	lb.		.04@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE			
(50% ch.) ex-ship N. Y.	lg. ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.36@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—Bulk	100 lbs.		.47½
In bbls.	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25-lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro (32-2-10° Be.)	"		.13¼@.13⅞
FELDSPAR—Ground	sh. ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg. ton		14.75
French, Best	"		11.75
FLOURSPAR—			
Am. lump, 1st grade	sh. ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr.	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.80
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80

	Cust.	Meas.	Price.
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
Am. pulv., other than R. I., f. o. b., New York	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01⅛
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03¼
Best pulverized	"		.04@.08
Italian, pulv.	"		.01¼
GYPSUM—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh. ton		15.50
Bricks, best imp., f.o.b. N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		190.00@200.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs		.75@.95
MANGANESE—			
Crude powd.			
70@75% binoxide	lb.		.01¼@.01½
75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 5%, Foreign	unit		.18@.19
Domestic	"		.20
MARBLE—Flour	sh. ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse.	sh. ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in	"		.80
3x4 in	"		1.50
4x4 in	"		2.00
6x6 in	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1.	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.14@.14½
Zero	"		.13½@.19
Summer	"		.13@.13½
Cylinder, dark steam ref.	"		.14½@.15½
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.21
Extra cold test	"		.25@.31
Gasoline, 86°@90°	"		.17@.22
Naphtha, crude, 68°@72°	bbl.		12.40
"Stove"	gal.		.15
Linseed, domestic raw	"		.34@.38
Boiled	"		.40
Calcutta, raw	"		.65
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd.	"		.05⅝@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06½@.08¼

	Cust.	Meas.	Price.
PAINTS AND COLORS— Metallic, brown	sh. ton		$19.00
Red	"		18.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01½@.01⅞
Orange mineral, Am.	"		.08½@.08¾
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.08
Turpentine, spirits	gal.		.53@.53½
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex. dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.06½
Green seal, dry	"		.06¼@.09½
POTASH—			
Caustic, ordinary	"		.04½@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst.	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am	"		.08½@.08¾
Scotch	"		.08½@.09
Bromide	"		.25@.38
Carbonate (80@85%)	"		.03½@.04⅜
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07½
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg. ton		9.50
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09½@.09⅝
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh. ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.25
Refined	"		4.00@4.50
SILICA—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord.	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.35½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. wk's.	100 lbs.		1.35
Extra domes., f.o.b. w'ks.	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.85
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@76%, f.o.b. w'ks.	"		1.70@1.85
Foreign, f.o.b. N. Y.	"		1.50@2.00
Chlorate, com'l	"		.07¼@.07⅝
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		2.02½
Peroxide	lb.		.45
Phosphate	"		.02½@.02¾
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¾
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh. ton		20.00
N. Y., Fibrous, best	"		10.28
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.40
Oil	"		4.50
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¾
Carbonate, ppt.	"		.09
Chloride so ution, com'l	"		.02¼
Chloride granular	"		.04½@.04¾
Dust	"		.04¾@.04½
Sulphate	"		.02½@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.		$1.50
CALCIUM—Tungstate (Scheelite)	"		.60
CERIUM—Nitrate	"		10.00
DIDYMIUM—Nitrate	"		35.00
ERBIUM—Nitrate	"		40.00
GLUCINUM—Nitrate	"		20.00
LANTHANUM—Nitrate	"		30.00
LITHIUM—Carbonate	"		1.35
LITHIUM—Nitrate	oz.		.60
STRONTIUM—Nitrate	lb.		.07¼@.08½
THORIUM—Nitrate 49@50%	"		4.50
URANIUM—Nitrate	oz.		.25
YTTRIUM—Nitrate	lb.		40.00
ZIRCONIUM—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.